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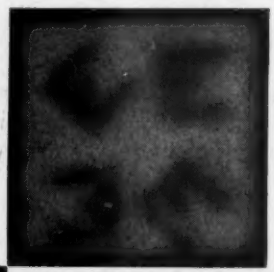

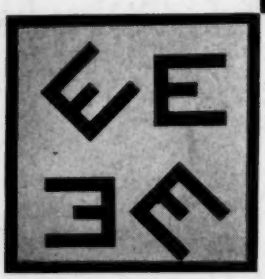

These photos were made by placing an ordinary blown coquille lens (above) and a ground and polished lens (left) in front of a Ferree Rand Acuity projector. Try this test. See it for yourself.

Twenty million people can't be wrong. They feel the need for glare protection but it was not provided for them by refractionists.

To this problem which is annually becoming greater, we believe that there is but one logical solution: Refractionists must consider the patients' need for glare protection and prescribe it for them either in a regular correction or with auxiliary lenses. For those patients who are at all hypersensitive to light, we recommend the correction being ground into a Soft-Lite lens in one of the four available shades.

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**Figure based upon surveys made by the Better Vision Institute*

The Advertisement is Published in the Interest of Eyesight Conservation by

RIGGS OPTICAL COMPANY

AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 19 APRIL, 1936 NUMBER 4

CONGENITAL AND FAMILIAL CYSTS AND FLOCCULI OF THE IRIS

ALFRED COWAN, M.D.
PHILADELPHIA

This is a report of four cases of familial and congenital cysts of the retinal pigment layer of the iris, three of which are described and illustrated. The cysts were bilateral in each instance and consisted of pigmented masses and pouches filled with fluid which projected from the posterior layers of the iris through the pupil and into the anterior chamber. Contraction of the pupil caused them to protrude farther into the anterior chamber. The cysts were capable of emptying and refilling. The ocular examinations were otherwise negative except that one patient had a divergent concomitant squint. Medical examination was negative in two of the cases; in the other there was a history of mental deficiency and chorea. The author considers the pathology allied to ectropium uveae. From the Laboratory of Ophthalmology, Wills Hospital, Philadelphia. Presented before the Section on Ophthalmology of the College of Physicians of Philadelphia, October 17, 1935.

This report concerns congenital cysts and flocculi of the retinal pigment layer of the iris occurring in both eyes of each of four closely related members of one family. A description of three of these follows.

Report of cases

Case 1. Mrs. T. T., aged 32 years, was first seen on October 5, 1935. She had no complaint whatever concerning her eyes and submitted herself for study merely because of my interest in her condition. The visual acuity was 6/6 + in each eye with + .50 D. cyl. axis 180° in the right and + 1.00 D. cyl. axis 180° in the left, ascertained under homatropine cycloplegia.

She had always been healthy except that, besides measles and whooping cough in early childhood, she had had scarlet fever at the age of 24 years and appendicitis at the age of 30 years. There was no history of injury nor inflammation of the eyes. The peculiarity of her pupils had existed as long as she could remember, but the large cyst at the lower edge of the left pupil had reached its present size eight years ago. Since then it has remained about the same size generally, but varies slightly with the size of the pupil and the position of the head.

There was no consanguinity in the family. The patient's mother and father both died of heart disease, one at the age of 60 and the other at 68 years. As far as she knew their eyes were normal. There were seven children, all living except one sister who died after childbirth at the age of 29 years. Of all of these the patient and her dead sister, who was 15 years her senior, were the only ones who had the condition under discussion.

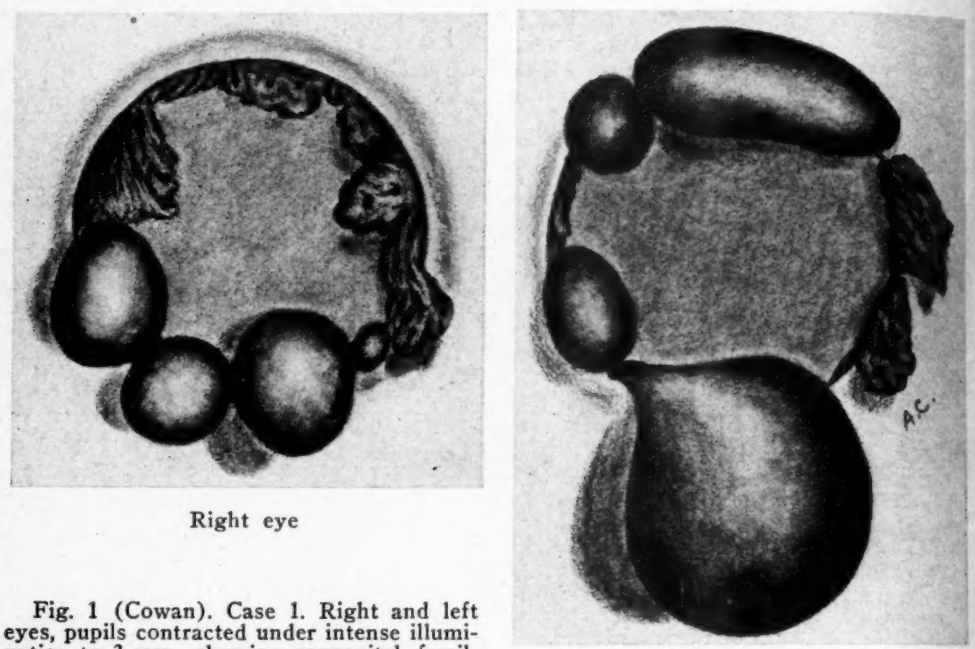
According to Mrs. T. T., the anomaly had been more pronounced in the deceased sister's eyes than in any of those here reported and it was transmitted to two (cases 2 and 3) of three of her children. Mrs. T. T. has but one child, whose eyes are normal.

The lids, conjunctiva, and cornea of both eyes were normal. The ocular rotations were full in all directions.

In the right eye (fig. 1), protruding from the posterior portion of the iris and extending forward in front of the plane of the iris, were a number of brown masses and cystic protuberances consisting of what was undoubtedly part of the retinal pigment layer of the

iris. They were arranged in a variety of forms—wrinkles, folds, ruffles, knobs, flocculi, rolls, and four globular, almost spherical-shaped cysts. The surfaces of the latter were smooth and finely granular. They were a lighter brown than the surfaces of the other masses and seemed to be constituted of a single layer of fine grains closely pupillary border to the limbus. The pupillary border was sharp and regular, and was free of any attachment of the pigment epithelium anteriorly at its margin. The lens, vitreous, and fundus were normal in every respect.

The left eye was analogous to the right except for the difference in size, shape, and position of the protuber-



Right eye

Left eye

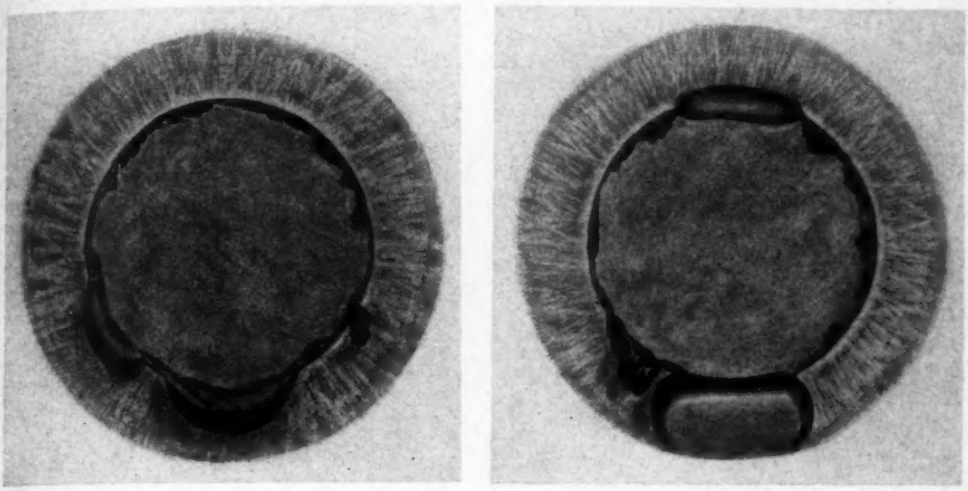
Fig. 1 (Cowan). Case 1. Right and left eyes, pupils contracted under intense illumination to 3 mm., showing congenital, familial cysts and flocculi of both irides.

massed, as if the original homogeneous surface of the pigmented epithelium had been stretched. They could be seen to be faintly translucent. The three larger ones each seemed to be attached to the posterior of the iris by a pedicle. They were slightly tremulous and changed their positions with movements of the head. When she tilted her head far backward the protuberances fell into the pupillary space and interfered with vision. The masses always came from the posterior surface of the iris leaving the pupillary border free. The stroma was light gray with no sign of a ruff or collarette corresponding to the lesser circle. The trabeculae took almost straight and continuous directions as radiating lines from the ances as seen in the illustration. The cyst which hung out of the lower portion of the pupil was so large that when she tilted her head back it filled the pupil so completely she could only barely see light. Even when she leaned forward it interfered with vision.

Figure 1 depicts the masses with the pupils contracted under intense illumination. Considerable change took place when the pupils were widely dilated under homatropine, as shown in figure 2. It will be seen that in the right eye two of the three large cysts below have coalesced into one. The small one near the 4-o'clock position has collapsed. Similar changes have taken place in the left eye. Here the small cyst at the top has collapsed and fallen behind the

plane of the iris. The smaller one below has also collapsed, but the empty sac hangs over the pupillary border like an apron. The largest cyst reaches the angle of the anterior chamber and presses against the cornea in front over a considerable area.

General and special examinations, including Wassermann and Kahn tests, urinalysis and blood-sugar tests gave negative results.



Right eye Left eye

Fig. 2 (Cowan). Case 1. Pupils dilated under homatropine to 7 mm. in diameter.

Case 2 (fig. 3). Miss T. A., aged 15 years, daughter of the deceased sister of Mrs. T. T., was referred to the laboratory of ophthalmology of the Wills Hospital on March 13, 1935, from the clinic of Dr. J. Milton Griscom, who has very kindly allowed this report to be made.

Her past medical history as well as her present general condition was negative, except that she was mentally deficient and had had chorea.

She came to the Wills Hospital because of dimness of vision (O. U. = 6/21) and a divergent, concomitant squint of the left eye. The vision could not be improved with glasses, although the media were clear and the fundi healthy.

The "peculiar pupils" were first noticed at the age of 12 years. The condition was probably present before this, but to a lesser degree. The drawing, which hardly requires further description, was made while the pupils were contracted by the light of the slitlamp to about 2½ mm. When the pupils were widely dilated with a mydriatic, all the protuberances became so much smaller that while they still occupied a considerable area of the pupil they did not hang over onto the surface of the iris. The irides were of the same color and form as those of Mrs. T. T.

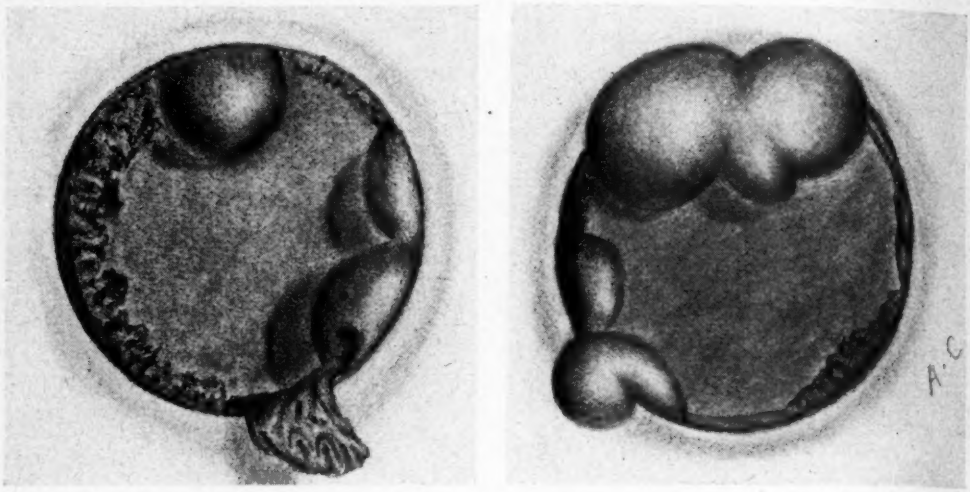
Case 3. Mr. E. A., single, aged 21 years, the brother of Miss T. A., complained of no ocular discomfort whatever, submitted very reluctantly to examination and was none too coöperative. His medical history was immaterial. The visual acuity was 6/5 + with either eye and aside from the iris anomaly shown in figure 4, the ocular findings were negative.

His eyes were affected to a lesser extent than those of either his sister or aunt, but the general picture was the same and the stroma of the irides was of exactly the same color and conformation as in theirs. The pupillary borders, wherever they were not hidden, were smooth and well defined except that at the 2-o'clock position in the right pupil there could be seen several free gray

strands which extended toward the periphery for a short distance and then merged into the stroma. This was the only instance in this series in which any connection between the pigmented protuberances and the iris stroma could be seen.

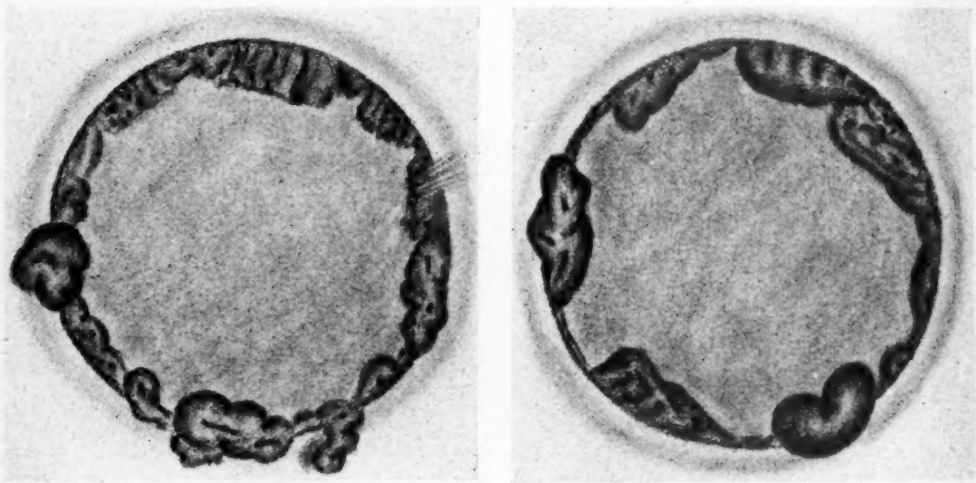
Conclusions

These globular protuberances are analogous to those previously reported and classified under congenital cysts of the iris; but that they are cysts in the true sense of the term is probably disputable. Possibly they are merely



Right eye Left eye

Fig. 3 (Cowan). Case 2. Right and left eyes, pupils contracted to 2½ mm.



Right eye Left eye

Fig. 4 (Cowan). Case 3. Right and left eyes, pupils contracted to 3 mm.

pouches or sacs formed between the two layers of the pigment epithelium of the iris. They certainly can be emptied and refilled.

The familial tendency of the condition in this group is sufficient verification that it is congenital in character; also that it is developmental and not the result of intrauterine traumatism, as has been proposed. The theory of von Szily and Gallemaerts that it is due to a failure of closure of the annular sinus is logical; but the appearance of the stroma in these cases proves that this also is faulty in development and should be included in the malformation. That the anomaly differs only in degree from that which is termed congenital ectropium uveae can be inferred from a study of figure 4. Here, also, there can be seen some justification for the traction theory of Vogt[1] in the fibrous bands at the 2-o'clock position. But this was the only place where, after careful observation of all these six eyes, even a semblance of any adhesion was found between the pigmented epithelium and the stroma. It hardly lends weight to Vogt's hypothesis.

Spontaneous cysts of the iris are rare. Town,[2] after a search of the literature, found that only 20 cases had been reported. Rarer still are congenital cysts of familial character and it is a strange coincidence that in the family group of three cases reported by Villard and Dejean,[3] in 1932, and referred to again in 1933, one of those affected was backward mentally.

1930 Chestnut Street.

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[1] Vogt, Alfred. Atlas of the slitlamp microscopy of the living eye. Trans. by Robert Von der Heydt. Berlin, Julius Springer, 1921, pp. 125-126.

[2] Town, A. E. Cyst of the uveal layer of the iris. Amer. Jour. Ophth., 1933, v. 16, Sept., p. 790.

[3] Villard, H., and Dejean, C. H. Cysts of the iris. Arch. d'Opht., 1933, v. 50, March, p. 194.

ANISEIKONIA

E. J. LUDVIGH, PH.D.
BOSTON

It has been suggested that aniseikonia not associated with anisometropia is more common than was formerly supposed. Aniseikonia of this type has been diagnosed by the use of a special instrument, and "iseikonic" lenses have been prescribed to correct the alleged defect. This paper suggests that the method of diagnosis may well be faulty and that if the lenses prescribed are efficacious this may be due to their ability to correct anisophoria rather than to their ability to correct aniseikonia.

Differences of image size between the two eyes occur normally in reading. These differences are much greater in magnitude than those which it has been deemed advisable to correct by the use of "iseikonic" lenses. It thus seems that it is not difference of image size *per se* which causes the patients' trouble. Theory and practice are difficult to reconcile in the field of aniseikonia. This difficulty, as also the nature of the patients' complaints, suggest the possibility that their distress may be chiefly of psychoneurotic origin. From the Howe Laboratory of Ophthalmology, Harvard University, and the Massachusetts Eye and Ear Infirmary.

Recently there has been considerable increase in the amount of interest shown in the problem of difference of image size in the two eyes and its effect on the visual mechanism as a whole. In the past, the main attention paid to this problem has been in connection with anisometropia of high degree, including that resulting from aphakia. If, in practice, the refractive errors in anisometropia are fully corrected, there results a difference in the size of the two retinal images which it is reported may cause diplopia, make binocular vision difficult or impossible, and cause discomfort. Anisometropia sufficient to cause discomfort, however, is not common, and anisometropic patients have been treated by various pragmatic methods,* without much attention to theoretical considerations. It seemed sufficient in fully corrected cases to explain these patients' difficulties by pointing to the obvious optical basis for difference in image size and to the disturbance in muscle balance incident to fixation in the peripheral field. Recently, members of the Department of Research in Physiological Optics of the Dartmouth Medical School have brought the problem of difference in image size, which they term "aniseikonia," into the limelight by experimental and theoretical work which apparently indicates that differences of image size are much more common than was formerly supposed and that relatively small differences, previously considered insignificant, may be of clinical importance. Although they have not defined aniseikonia with exactness, it is to be inferred from their use of the term that they believe themselves to be dealing with differences in apparent size. The latter, however, are dependent upon differences in apparent distance, and what they really have attempted to measure with their clinical apparatus are differences in apparent direction. In other words, they are simply dealing with the old problem of the horopter.

The method described by the Dartmouth workers for measuring the degree of aniseikonia is to present, by means of suitable apparatus, two targets, one to each eye. Both targets have similar annular centers but are dissimilar at their peripheries. The one target has at the middle of each peripheral edge a line with a gap, the other target has at each peripheral edge a star which corresponds in position to the center of the gap in the line.

The patient first fixates and unites the similar centers of the two targets. He then fixes one of the formerly peripheral lines and notes the apparent relative position of the corresponding star image. If the star image lies in the center of the gap in the dashed line, the images of the two eyes are taken to be of equal size in the meridian measured. If the star image does not lie in the center of the gap in the dashed line, the images of the two eyes are taken to be of unequal size in the meridian measured

* Giving each eye a partial refractive correction, not correcting the poorer eye at all, letting experience overcome the asthenopia, sometimes by means of complete replacement.

and various special lenses** are placed before one eye until the image of the star falls within the gap. The strength of the correcting lens necessary to produce this effect is a measure of the difference in image size between the two eyes in the meridian in question. Verhoeff has suggested[1] that what is being measured by this procedure is not image size but phoria, at least in part. The vital point here is: To what extent do the central annuli of the targets suffice to attract or hold peripheral binocular fixation? Here a further question must be put, namely: In what sense does peripheral fixation exist? The use of the term fixation is here confusing, as one ordinarily thinks of "fixation" as meaning "bringing the fovea to bear on." "Peripheral unification," or "fusion," however, means only that two corresponding points of the retinal peripheries are stimulated by the same point of the object. For example, we may fixate the same point with both foveae and then place a point object on the proper horopter so that it is not seen double. Here there is unification or "fusion" of the peripheral retinal images, but this unification is not achieved voluntarily nor at the expense of doubling an object which stimulates either fovea. There is single vision of the peripheral point, but this only occurs coincidentally as an accompaniment of binocular foveal fixation. Even when the foveae are quite unaffected by external stimuli, it is difficult to show any tendency to peripheral binocular fixation of an object in the periphery. This fact may be demonstrated by the simple experiment of having a point source of light some distance from the horopter exposed in the periphery of the visual field in an otherwise dark room. The point source appears double and can ordinarily be made to appear single in the periphery only by imagining that one is fixing an approaching or receding object and thus gradually converging and diverging the optic axes until the point source appears single. If, during this experiment, another actual competing object is brought into the field, and one of its images falls near one fovea, only an experienced observer can prevent the foveal stimulus from taking full control of the visual axes. The argument presented for the apparatus on this point is that the images (star and dashed line) are dissimilar and, "Since fusion occurs only for similar images, it can be prevented by presenting to each eye dissimilar objects. . . ."[2] That dissimilar images cannot be fixed binocularly is false. Under certain conditions a point may undergo binocular fixation with a line, so that the point appears in the line. (A tendency towards such fixation may be seen in the Maddox rod test.) Furthermore, if the horizontal diameter of a circle be presented to one eye and the circle to the other, there is a tendency to fixate so that the diameter fits the circle perfectly. This need not be called fusion, but there is a definite tendency to put the eyes in one certain position. The tendency appears to be to fixate so that the resulting conscious image will be of simple contour. And in fact Verhoeff[3] has shown that two vertical lines one above the other and horizontally disparate may be fixated so that one appears directly below the other. He has shown also that if in a stereoscope a dashed line tilted to the left be presented to the left eye and a dashed line tilted to the right be presented to the right eye, these images may undergo quasi-unification or so-called fusion to form a single line with the appropriate depth effect, even though the left-eye dashes correspond to the right-eye gaps and vice versa, so that there is no overlapping of the images.

It seems, therefore, that as the patient looks towards the star-and-line combination in the apparatus, a conflict ensues between the strong tendency to unify or align foveal images (weakened somewhat, in this case, by dissimilar foveal images) and the weak tendency to unify or align peripheral images (strengthened, in this case, by the similarity of the peripheral images). In later forms of the apparatus in which a bright and a dark dot are substituted for the star-and-line combination, the tendency to foveal binocular fixation might be still stronger. Here what is measured is the relative

** Lenses which have magnifying power but negligible dioptric power.

strengths of the tendencies to unify or align foveal and peripheral images under the existing conditions, and phoria would be expected to enter the conflict. Individuals having variations in the amount of phoria for different positions of the eyes, when tested by the clinical apparatus would be thought to have aniseikonia. In this connection it is to be noted that Friedenwald[4] has brought forward evidence to show that such variation in the amount of heterophoria for different positions of the eye, which he terms "anisophoria," may be sufficient to cause discomfort which can be relieved by the use of iseikonic lenses, and suggests that anisophoria may be the real cause of the discomfort in alleged cases of aniseikonia. He points out that lenses used for the correction of aniseikonia will produce an anisophoric effect, whether or not aniseikonia actually exists. Anisophoria is a long-known and easily recognized condition, but it does not appear that Ames and his co-workers have investigated the possibility of its existence in their cases. It would seem vital to exclude this possibility before investigating the question of aniseikonia.

It is, however, possible that the clinical apparatus used actually minimizes the tendency to binocular foveal fixation to such an extent that it is negligible. If so, what factors now operate? The patient first foveally fixates the annulus and then looks off to the star-and-dashed-line combination which for the cyclopean eye is 4 degrees away, in a frontal plane. Suppose this lateral movement of the eyes to occur without change in the angle of convergence, then the images of star and dashes will not be in line unless the patient's horopter is a frontal plane for the fixation distance in use. Under these conditions what is being measured is just the Hering-Hillebrand deviation. On the other hand, assuming that change in convergence occurs, then it seems probable that phoria has produced a deviation during the course of the movement.

The foregoing considerations and observations make it seem more than probable that phoria enters into the determination of image size when the clinical apparatus is used. If, at least in part, the measurements are indicative of phoria, we have a plausible explanation of the observation that the vertical "image-size differences" are ordinarily less than the horizontal.[5] For this would follow from the slower reaction of sursumduction than that of lateriduction to a change of fixation.

The evidence in favor of the clinical apparatus' precision in determining size differences has been stated as follows: "First, practically all of the patients report that a noticeable displacement of the star points of light relative to the lines is produced by a change of size of the image of one eye by 0.50 percent. Many can detect a difference of 0.25 percent and some less than 0.25 percent.

Second, determinations of the size differences of patients whose size is corrected, taken after a lapse of time, usually check within 0.25 percent.

Third, the measurements obtained by this method agree closely with those made by apparent frontal plane horopter and grid-nonius horopter methods, which will be described later."[6] The first and second points have no particular bearing on the question of to what extent it is image-size difference that is being measured. The third point, however, seems very strong. Agreement of the results obtained by the clinical apparatus with those by the grid-nonius apparatus, a modification of Tschermak's binocular nonius method, would appear to be excellent evidence that the clinical apparatus measured difference in image size and not phoria, since in the grid-nonius method central fixation is presumably held throughout, while alignment is adjusted in the peripheral field. Unfortunately, evidence of the degree of the agreement between the two methods does not appear. The statement that the clinical-apparatus measurements agree closely with those of the frontal-plane horopter and grid-nonius horopter is also difficult to interpret in view of the fact that the angular difference between the center and the periphery of the clinical apparatus is only 4 degrees. Speaking of the grid-nonius horopters, it is reported that, "Horopters so determined vary quite consistently with the variation of the dioptric

image as do those determined by the criterion of the frontal plane. In form they are somewhat similar to the latter in their peripheral regions, but they differ markedly from them near the point of fixation."[7] If the grid-nonius and frontal-plane horopters differ markedly from each other, it is difficult to see how the clinical-apparatus measurements can closely agree with them both. "Fixation disparity" may be the reconciling factor.

Even if it developed that the use of the clinical apparatus as an indication of image-size difference could not be justified, recourse could still be had to the grid-nonius method. This would require a certain amount of training of the patients and a tax on their endurance, but the resulting greater assurance in the interpretation of the results would seem to justify the added labor. Here it would seem advisable to do the work with individuals who are suspected of image-size difference and not, as has ordinarily been done in the past, with normal individuals wearing a magnifying lens temporarily to produce a difference of retinal-image size.

Ogle's[8] mathematical treatment of the horopter and the effect of iseikonic lenses on its position in normal individuals is interesting, and experimental data yield the theoretically predicted horopters. With normal individuals, however, this agreement between theory and experiment would be expected on purely physical optical grounds. Similarly the experience of a plane apparently tilting when an iseikonic lens is placed before one eye is striking, but little analogy can be drawn between this experience and that of a patient with nonartificial aniseikonia. It is not apparent in the aniseikonia dealt with by Ames as it is in that of anisometropia or artificial anisometropia produced in normal individuals by iseikonic lenses that the difference in conscious image size, if it exists, is of physical optical origin.

Suppose a difference of image size to exist; what are its probable consequences? Assume an object which subtends 10 degrees or 36,000 seconds of arc at the fovea of, say, the left eye. If the apparent image size is 1 percent larger in the right eye, then the difference of image size will be 360 seconds of arc. If the object subtends an angle of 1 degree, then the difference of image size will be 36 seconds of arc. The smaller the angle subtended by the object is, the smaller will be the absolute angular difference of image sizes. Ames and Ogle discuss[9] the question "Should relative differences of position of images on the peripheral retinas of this magnitude be capable of discrimination?" Accepting with reservations the validity of applying the concept of retinal acuity to the conscious image, we may follow Ames's and Ogle's discussion. The absolute acuity for objects at various angles from the point of fixation is computed by applying the data of Wertheim[10] and Fick[11] concerned with the relative visual acuity of the peripheral retina to the known absolute-acuity data for the fovea. Going from the fovea to the periphery, the angular image-size difference increases more rapidly than the acuity of the retina decreases, so that a given percentage of angular image-size difference should be more effective at the periphery than at the fovea. As Ames and Ogle say, "the sensitivity to difference in the size of ocular images on the periphery should be greater than that near the fovea."[12] They also conclude that, assuming a foveal resolving power of 10 seconds of arc, the threshold value for distinguishing a difference in size of the ocular images in the two eyes is between .10 and .25 percent. Where the image-size difference is "two or three times the threshold value for size discrimination"[13] difficulty should result. This means that if the image-size difference at or near the fovea is approximately 25 seconds of arc, the danger zone is approaching. Let us first consider only vertical image-size differences. As I read normal-size newspaper print at a distance of 40 cm., the height of a letter subtends approximately 580 seconds of arc. To cause annoyance due to vertical disparateness near the fovea, the image-size difference according to Ames must be 25 seconds of arc, or 4.31 percent. But Carleton's and Madigan's[14] clinical report of 132 cases gives the largest cylindrical size difference found as 4.25

percent. They surmise that for larger image-size differences fusion fails. This indicates that, for reading, ordinarily only cylindrical correction could be of clinical importance; the possibility of vertical differences causing annoyance may be practically neglected.

Ames[15] contends, on the contrary, that a difference of image size of even .5 percent is sufficient to cause ocular "trouble," yet, for reading, using his own assumption, we find that vertical differences of over 4 percent should not do so. This discrepancy illustrates the fact that the possible significance of a given percentage of difference of image-size is dependent upon the sizes of the visual angles subtended by the object.

In general, it may be noted that in dealing with objects which subtend small angles near the fovea, the percentage difference of image size must be very high to pass the limen of visual acuity. And, indeed, near the center of the fovea the images are negligibly different in size no matter what percentage difference of image-size may exist elsewhere. As Ames and Ogle express it, "at the axis there would be no difference in the relative position of the two images on the respective retinas."[16] It seems that it is the periphery which should be expected to cause trouble. But Carleton and Madigan[17] note "A striking phenomenon that appeared in the course of these measurements was the large number of cases that showed a partial or local suppression which takes place only at the forea. . . . Of the total number of patients examined, 71 percent showed this type of suppression."

If the phenomenon described is really abnormal,* as is evidently assumed, and not a psychoneurotic manifestation, it is indeed striking, because it is admitted that the foveae suffer hardly at all from differences of image size.

Similarly, one should expect that image-size difference would be most annoying for objects subtending large angles. The fact, on the contrary, is that discomfort on reading is the common complaint. In the last series of clinical observations which has come to the author's attention,[19] six patients complained of particular discomfort on reading and only one of particular discomfort on watching the movies. Six patients did not differentiate between the effect of near and distant vision.

Previously we have considered mainly the vertical differences of image size in reading. Horizontal differences of image size would seem to be of greater importance than vertical differences, as the image dealt with is only one letter high but the whole page wide. The width of print read at one fixation is, of course, not so great as the width of the page. Assume the width of a line to be 10 cm., approximately 4 inches. With four fixations per line, 2.5 cm. of print will be read at each fixation pause, 1.25 cm. to either side of the fixation point. We may consider 2.5 cm., then, as the width of the image. If the reading distance be 30 cm., this image will subtend an angle of 4.75 degrees $= 4° 44' 24'' = 17084''$. The outer edges of the image fall 2.37 degrees nasally and temporally. Interpolating from the data of Hofmann[20] on monocular alignment in the periphery, we find that at an angle of eccentricity of 2.37 degrees the least perceptible angle of difference would be slightly over 69 seconds of arc. When the image-size difference is 2.5 times the limen according to Ames, we may expect annoyance. In this case, then, annoyance may be caused when the angular-size difference at an image edge amounts to 172 seconds of arc. A difference of image size of 2 percent would give an angular-size difference of $.02 \times 17084'' = 342$ seconds of arc, and if of this difference half applies at each edge, there is an edge difference of 171 seconds of arc. It may therefore be inferred that, in reading, a horizontal image-size difference of less than 2 percent will be negligible. But in spite of the fact that reading causes the greatest discomfort in alleged cases of aniseikonia, the average correction prescribed has been well below this figure. If the horizontal-image-size difference were above 2 percent, correction would be needed, according to this point of view, unless the patient chose to utilize five

* Verhoeff[18] has recently pointed out that "suppression" at the fovea is a phenomenon of normal vision and that it does not interfere with binocular central fixation.

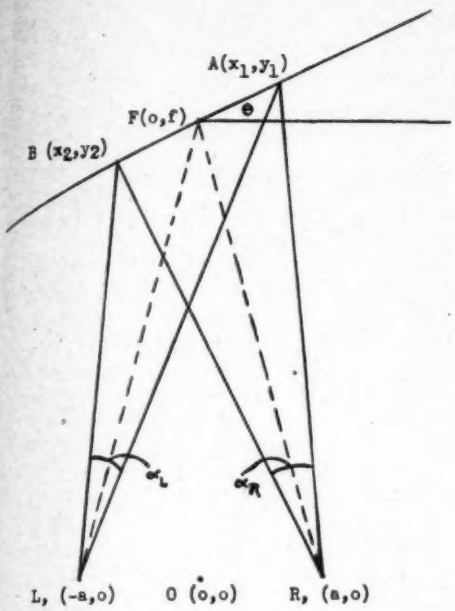

Fig. 1

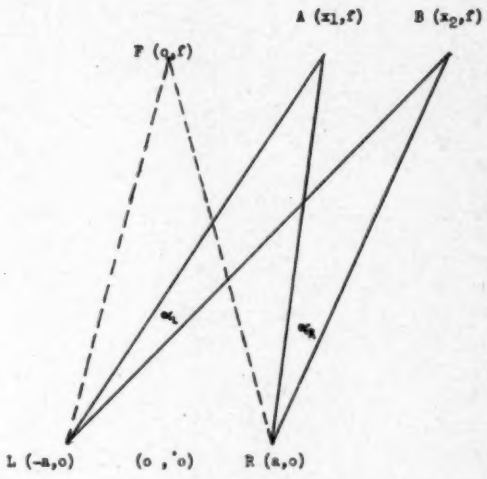

Fig. 2

Fig. 1 (Ludvigh). Schematic drawing to illustrate disparity of image size when a book is read while held at an angle.

Fig. 2 (Ludvigh). Schematic drawing to illustrate the relative size of retinal images when a book is read while held in the frontal plane; the points A and B are on the same horizontal line and in the plane of the book.

fixation pauses rather than four per line, or to move the book farther from the eyes.

The question now arises: Is correction needed for reading even if the differences are supraliminal? Let us consider those differences of image size which occur in every-day reading and go uncorrected without apparent harm. Suppose that the plane of the book makes a slight angle with the frontal plane as commonly occurs when one reads in a reclining position or when the book is supported on the arm of a chair. Consider a simple case of this problem, as in figure 1. We select as axis of abscissae the straight line passing through the nodal points of the two eyes and as origin the midpoint between the two nodal points on the x-axis. If we let the interocular distance equal 2a, then the nodal point of the left eye, L, has the coördinates (−a, o) and that of the right eye, R, (a, o). Assuming the fixation point in the median plane at the distance, f, we have as the coördinates of the fixation point, F (o, f). We select now two points, A, B, on the same horizontal line of the tilted book such that $x_1 = -x_2$. Let θ be the angle made by the book with the frontal plane, and α_L, α_R, the angles subtended by $\overline{AB}$ at the nodal points of the left and right eyes, and letting λ indicate slope, then:

$$x_1 = x_1$$

$$x_2 = -x_1$$

$$y_1 = f + x_1 \tan\theta$$

$$y_2 = f - x_1 \tan\theta$$

$$\lambda_{LB} = \frac{f - x_1 \tan\theta}{a - x_1} \tag{1}$$

$$\lambda_{LA} = \frac{f + x_1 \tan\theta}{a + x_1} \tag{2}$$

and since $\tan(A-B) = \dfrac{\tan A - \tan B}{1 + \tan A \tan B}$

we have

$$\tan\alpha_L = \frac{\lambda_{LB} - \lambda_{LA}}{1 + \lambda_{LB}\lambda_{LA}} \tag{3}$$

substituting (1) and (2) in (3), clearing, and dropping the subscript

$$(4)\quad \tan \alpha_L = \frac{2x(f - a\tan\theta)}{(a-x)(a+x)+(f-x\tan\theta)(f+x\tan\theta)}$$

similarly it may be shown that

$$(5)\quad \tan \alpha_L = \frac{2x(f + a\tan\theta)}{(a-x)(a+x)+(f-x\tan\theta)(f+x\tan\theta)}$$

We are interested in the percentage difference between α_L and α_R. Representing these angles in terms of their tangents we have

$$(6)\quad \text{Percentage difference} = D = \frac{\tan\alpha_R - \tan\alpha_L}{\tan\alpha_L} \times 100.$$

Substituting (4) and (5) in (6) and reducing, we have

$$(7)\quad D = \frac{2a\tan\theta}{f - a\tan\theta} \times 100.$$

If we take f = 30 cm. and a = 3.2 cm., we find that a rotation of the book of only 5.35 degrees from the frontal plane results in a D of slightly over 2 percent. A rotation of 45 degrees causes an image-size difference of almost 24 percent, but this does not interfere with reading nor does diplopia result. This simple case of the tilted book, be it noted, is uncomplicated by any question of unsymmetrical convergence of the eyes or of possible correction by the Hering-Hillebrand deviation even were the latter of magnitude comparable to that of the image-size difference.

Let us now consider the case in which the book is held in the frontal plane and the points B and A are on the same horizontal line and in the plane of the book, as in figure 2. Again we select as axis of abscissae the straight line passing through the nodal points of the two eyes and as origin the midpoint between the two nodal points on the x-axis. The interocular distance is 2a, and the nodal points and fixation point are L(−a, o), R(a, o), and F(o, f). The points A and B are in the plane of the book, A(x_1, f), B(x_2, f). α_L and α_R are the angles subtended by $\overline{AB}$ at the nodal points of the left and right eyes. Now

$$(8)\quad \lambda_{LA} = \frac{f}{x_1 + a} \quad \text{and}$$

$$(9)\quad \lambda_{LB} = \frac{f}{x_2 + a} \quad \text{then}$$

$$(10)\quad \tan\alpha_L = \frac{\lambda_{LA} - \lambda_{LB}}{1 + \lambda_{LA}\lambda_{LB}}.$$

Substituting (8) and (9) in (10) and clearing

$$(11)\quad \tan\alpha_L = \frac{f(x_2 - x_1)}{(x_1+a)(x_2+a)+f^2}$$

similarly it may be shown that

$$(12)\quad \tan\alpha_R = \frac{f(x_2 - x_1)}{(x_1-a)(x_2-a)+f^2}.$$

The percentage difference between α_L and α_R is

$$(6)\quad \text{Percentage difference} = D = \frac{\tan\alpha_R - \tan\alpha_L}{\tan\alpha_L}.$$

Substituting (11) and (12) in (6) and reducing we have

$$(13)\quad D = \frac{2a(x_1+x_2)}{(x_1-a)(x_2-a)+f^2}.$$

Let us see under what conditions D is at a maximum. Taking the partial derivatives of D with respect to x_1 and x_2 and setting them equal to 0 we have

$$(14)\quad \frac{\partial D}{\partial x_1} = \frac{2a(a^2+f^2-x_2^2)}{[(x_1-a)(x_2-a)+f^2]^2} = 0$$

$$(15)\quad \frac{\partial D}{\partial x_2} = \frac{2a(a^2+f^2-x_1^2)}{[(x_1-a)(x_2-a)+f^2]^2} = 0.$$

Both (14) and (15) can be satisfied by a = 0, or by $a^2+f^2=x_2^2$ for (14) and $a^2+f^2=x_1^2$ for (15). The condition a = 0 clearly is a minimum, since it implies a cyclopean nodal point. The maximum results from the simultaneous satisfaction of $a^2+f^2=x_2^2$ and $a^2+f^2=x_1^2$

which is $a^2+f^2=x_2^2=x_1^2$ or if x_1 and x_2 are both on the right side of the fixation point

$$\sqrt{a^2+f^2}=x_2=x_1. \tag{16}$$

Now letting $a=3.2$ cm. and $f=30$ cm., then $x_2=x_1=30.17$ cm. and substituting in (13) we find that the difference of image size is 23.7 percent. Despite this large difference in image size, reading is surprisingly unhampered under these conditions. Eventually, of course, the process becomes tiring because of the rather extreme conjugate deviation of the eyes.

Consideration of figure 2 shows that the image-size difference will hold no matter what point of the horizontal line is fixated. If the point B be fixated, there will be a difference of image size at the fovea. If, on the other hand, the point F is fixated and the object is considered as the line of print between F and B, then there will be no difference of image size at the fovea, but the distance from F to B will appear larger for one eye than for the other and there will be horizontal disparateness at B of the magnitude indicated by (13). Suppose that in

$$D=\frac{2a(x_1+x_2)}{(x_1-a)(x_2-a)+f^2} \tag{13}$$

we let $x_1=x_2$ which means that the points A and B coincide in the plane, then we have

$$D=\frac{4ax_2}{(x_2-a)^2+f^2} \tag{17}$$

which gives us the difference of image size at the point B, whether or not that point or some other point on the line is fixated. If, however, in (13) we let $x_1 = 0$ we have

$$D=\frac{2ax_2}{a^2-ax_2+f^2} \tag{18}$$

which gives us the difference of image size of the line FB. If now the point F is actually being fixated, (18) will give us a measure of lateral disparateness at the point B.

Heretofore we have been dealing with rather extreme conditions which indicate the relatively tremendous differences of image size that can be tolerated. Let us now consider the differences of image size that occur under unusually perfect reading conditions. Assume a book with printed lines 10 cm. wide (and books of considerably greater width are read without head movements) placed in the frontal plane at a distance of 30 cm. with the middle of the page in the median plane. Let us assume an interocular distance of 6.4 cm., which is also conservative. Suppose that the letter on the extreme left hand side of the page be fixated. Application of (17) indicates that the image of this letter is 7.08 percent larger in the left eye than in the right. But on fixating the letter at the extreme right, the image of this letter is 7.08 percent larger in the right eye than in the left. A change of over 14 percent in the relative sizes of the foveal images of the two eyes may occur while reading a line of print. It must be remembered that these differences are represented on the foveae where the acuity is greatest. In general there are also differences in image size at other parts of the retinae. Thus if the middle of the page be fixated, the extreme right-hand letter will be laterally displaced by 3.58 percent of half the width of the line of print or 3.58 percent of 5 cm. Neither Ames nor his associates have mentioned these enormous differences in image size that occur in the normal use of the eyes.

It might be thought that the Hering-Hillebrand deviation could correct these image-size differences, but this is not the case. In the first place, the Hering-Hillebrand deviation does not apply at the fovea at all, and hence could not alter the large foveal image size differences. Secondly, even in the periphery the Hering-Hillebrand deviation, if considered constant, is not sufficient to correct even the peripheral differences of image size. Ames, Ogle, and Glidden, however, have made observations and drawn conclusions which, if valid, might, to a slight extent, indicate that these differences are compensated, in part at least. Their observations indicate that the Hering-Hillebrand deviation varies for different distances, and they suggest that this may be due to movement of the choroid and retina

upon the sclera during accommodation. The evidence upon which this suggestion is based seems too slight to discuss here.

They have also observed that the size of an image in the vertical meridian is changed by asymmetrical convergence. They say,[21] "Now when one looks at an object with asymmetrical convergence, the distance from the two eyes is different. The image of such an object formed in the nearer eye will be larger than that formed in the other. Now it happens that with the particular setup chosen for the measurements described above, the difference (about 2 percent) found in the relative sizes of the ocular images in the vertical meridian is almost exactly the amount that would be necessary to make up for the difference in size of the two images due to the difference in distance. This may be only a coincidence." The conditions under which these observations were made are not sufficiently clearly set forth for anyone to repeat the experiments. Ames, Ogle, and Gliddon suggest that this compensation of size difference may be due to some anatomical or optical change in the eyes, but offer no explanation as to what this change may be.

Possibly they may rely on an argument similar to that proposed to explain the change of the Hering-Hillebrand deviation with accommodation. Aside from the fact that on lateral deviation of the eyes displacement of the retina has not been shown and is *a priori* improbable, this argument runs into further difficulties. First, even if the vertical differences of image size were corrected in this fashion, the horizontal differences of image size, due not only to a difference in the distances of the object to the two eyes, but also to a difference in the angle of view for the two eyes which Ames, Ogle, and Gliddon do not consider, are much larger and would not be corrected except by relatively enormous differences in the amount of horizontal displacement of the two retinas. Second, even if retinal displacements, deformations of the cornea due to eyelid pressure, and so on, could compensate for image-size differences of the magnitude expected on lateral fixation, it seems improbable that this correction would adequately compensate for the various image-size differences encountered at various degrees of eccentric fixation. The compensation would have to be not only of varying amount but also of varying degrees of asymmetry. Such corrections would seem more adequately attempted by the cortex rather than by anatomical displacements.

It seems, then, that differences of image size normally occur in reading which dwarf the assumed differences in image size that Ames has deemed necessary to correct. This makes it appear that it was not differences of image size *per se* which caused his patients trouble. If this is true, it goes far toward explaining the difficulty of relating theory to practice in this field. It is stated by Ames[22] that in cases of patients with aniseikonia the amount of rotation of the apparent frontal plane substantially conforms to the image-size difference. But, so far as appears, the patients do not complain of distortion of the field corresponding to this rotation. Theory would predict much difficulty at the movies, but the patients chiefly complain of distress on reading. Theory would predict possible peripheral "suppression"; the patients are said to have a local suppression at the fovea. The patients complain of headache, "excessive tiring of eyes," photophobia, eye-ache, "stomach conditions," "tight band around head" (the helmet sensation), "dizziness," "feeling of tension," "nervous condition," and "nervous breakdown," none of which symptoms is specific for the alleged ocular condition and all of which are frequently psychoneurotic manifestations. In addition to the nature of the patients' complaints, the difficulty experienced in producing more than a temporarily satisfactory result by iseikonic lenses, and the frequency with which the latter are changed, suggest the possibility that the patients' distress may be chiefly of psychoneurotic origin. This possibility might be checked by using a control group of patients in which the correction was applied to the theoretically wrong eye and noting whether or not the percentage of successful results

decreased under those conditions.

And finally, if eventually it can be shown that the symptoms are really relieved by iseikonic lenses, the question raised by Friedenwald's observations must still be answered, namely: Is the efficacy, if proved, of iseikonic lenses due to their tendency to correct anisophoria rather than aniseikonia?

From the foregoing considerations, the final conclusion is reached that the contention for the existence of aniseikonia, other than that due to obvious physical optical causes, is based upon inconclusive evidence, and furthermore derives little support from theory, since it has not been demonstrated that the patients' complaints are attributable to the condition with which the theory deals.

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THE VALUE OF OPHTHALMOSCOPIC EXAMINATION IN THE DIAGNOSIS OF SYSTEMIC DISEASES

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Ophthalmoscopic examination is a routine procedure in the diagnostic study of every medical case. The internist should therefore be an ophthalmologist insofar as ophthalmoscopy is concerned with systemic diseases. Important information is obtained from this source of examination in cases of essential hypertension, nephritis, arteriosclerosis, heart disease, toxemias of pregnancy, diabetes mellitus, blood dyscrasias, and diseases of the nervous system. The paper deals with the ophthalmoscopic findings in vascular diseases, renal diseases, toxemias of pregnancy, and heart disease. It includes an explanation of the various pictures seen. The terms, retinitis and neuroretinitis, are discussed; they are considered improper because these conditions are not inflammatory in origin. Also, neuroretinitis is merely an advanced stage of so-called retinitis. These conditions have some prognostic importance, but are probably not of great importance in the differential diagnosis of conditions in which there is hypertension. Vascular constriction and vascular spasm are probably the basis of all the changes in the retina in various diseases associated with hypertension. Delivered before the Washington, D.C. Ophthalmological Society, November 4, 1935, and transcribed by Dr. Hugh H. Hussey.

As a preface to my remarks, I wish to express the hope that you will not think me presumptuous in discussing the subject of ophthalmoscopy in relation to medical diagnosis. As a matter of fact, I am embarrassed to appear thus before a group of ophthalmologists, for I do not claim to be one. However, every internist should be a good ophthalmologist insofar as this special field is related to general clinical medicine; and, on the other hand, the ophthalmologist should avail himself of all of the clinical facts in a case before he attempts to make a diagnosis based mainly upon examination of the ocular fundi. It is a part of every general physical examination to study the ocular fundi, since they often show changes which are a direct aid in the interpretation of other clinical data. When the ophthalmologist is consulted by the internist, he should be given all of the clinical data in the case, just as the roentgenologist or the pathologist should be informed of the whole clinical picture of a case before he is expected to assist in diagnosis.

The points of ophthalmological study which are of greatest interest to the internist are, first, those which are concerned with vascular changes in the retinae and the so-called retinitides, including arteriosclerosis, nephritis, hypertension, and toxemia of pregnancy; second, the retinal changes which occur in cases of heart disease; third, the retinal changes associated with anemias, leukemias, and purpura hemorrhagica; fourth, the changes in the ocular fundus which accompany diabetes mellitus; and, fifth, the ophthalmological changes which occur in diseases of the central nervous system. In the limited time at my disposal, I shall probably be able to speak only of the first two of these points.

To begin with, it is important that there should be some uniformity of conception of the data to be discussed. For this reason, each subject will be introduced by a few words that are essentially general in nature. It should be added that these ideas represent only one concept, and, although they are widely accepted in large part, there are considerable differences of opinion among clinicians in regard to some of them.

Arteriosclerosis

Arteriosclerosis is a degenerative disease of the blood vessels, involving the large and medium-sized arteries particularly. It occurs normally with old age, but in some individuals it may appear in relatively early life, often for unknown reasons. It is a more or less generalized condition, but in some people it may involve one or more parts of the vascular tree more severely than others, such as the brain, the heart, the kidneys, and the extremities. Arterio-

sclerosis is not a cause of hypertension, although hypertension may coexist.

Although there may be much difference of opinion on this point, I believe that there is no general agreement as to the retinal picture of arteriosclerosis and that considerable experience is necessary to detect it. The retinal arteries, it should be remembered, are really arterioles, so that arteriosclerosis, which tends more often to involve larger vessels, may be manifested late in the retinae. However, one sometimes sees general reduction in caliber of the lumen of the arterioles but not the irregularity in width nor the diminution in total diameter which occurs so regularly in advanced hypertension. The luster of the arterial stripe or "light reflex" is dimmed instead of brightened as it is in hypertension. The arteriovenous compression that is so common in cases of high blood pressure is rarely seen in decrescent* arteriosclerosis.

Hypertension

By way of introduction, it is well to state that there is much discussion about the fundamental nature of hypertension, which in probably 95 percent of cases is due to essential hypertension and in the other 5 percent to nephritis or other causes. My own concept of essential hypertension is that it is due to an abnormal sensitivity of the vasomotor system, probably of the vasomotor center in the medulla. Therefore, it affects all of the arterioles of the body, and in many cases in its initial stages it may be a very benign condition. People with this condition react excessively to stimuli which do not affect other individuals. Thus, it is known that the blood pressure of a normal person rises when he is afraid, but the individual with a tendency to essential hypertension manifests a fear reaction of his blood pressure in response to very minor psychic influences. As time goes on, the base line to which his blood pressure returns after its abnormal response rises higher and higher, so that eventually, perhaps after years, it stays high and fluctuates very little. The individual can then be said to have entered a "fixed stage" of hypertension.

In the "fluctuating stage" of hypertension there are rarely any observable vascular changes, but in the "fixed stage" degenerative changes take place in the arterioles more or less in all parts of the body. At first, the only change is hypertrophy of the muscular coat of the arterioles, the kind of change that occurs in any muscular tissue that is subjected to excessive activity. Later, there are definitely degenerative changes consisting mainly of fibrosis of the arteriolar media and adventitia; and, last, there may be intimal and subintimal fibrosis and hyalinization. With these changes the arteriolar lumina become progressively smaller.

All of these changes can be seen in the arterioles of the retina, and it follows from what has been said that they may not be seen until hypertension has entered a "fixed stage." However, earlier, from time to time, excessive spasm of the retinal arterioles may be noted on ophthalmoscopic examination, although such excessive spasm is perhaps more characteristic of the vessels during the "fixed stage," when, strangely enough, they seem to have an even greater capacity for constriction.

The typical changes of hypertension in the ocular fundi, as seen in the later stages of the disease, are as follows: There is more or less generalized narrowing of the arterioles which, of course, may be extreme if they are seen during a period of excessive spasm. Even more important in the "fixed stage" of the disease is an irregularity of the width of the vessels, and this is a sure sign of degenerative changes. There is an increase in the luster of the arteriolar "reflex stripe," and, although it is less important, arteriovenous compression (bulging of the veins where the arterioles cross them) is often seen. Then, there may be an increase in length and tortuosity of the arterioles, but this is less easily determinable, especially to the novice. When an arteriole is completely obliterated,

* Ed. Note. The term "decrescent arteriosclerosis," according to the author, "is one that is applied to the arteriosclerosis that is merely an accompaniment of old age."

as by thrombosis, it appears as a thin white line. Sometimes thin white lines are seen on the outer borders of the arterioles. The veins may be distended. All of this retinal picture is certainly due to vascular change.

Not infrequently, in cases of essential hypertension one sees so-called retinitis and neuroretinitis, both of which terms are bad because they are used to indicate conditions which are not really inflammatory in nature. These changes are due probably to sudden excessive or superadded vasoconstriction with consequent reduction in the blood supply to the retina, resulting in rather acute partial ischemia and stasis. Hemorrhages are most common, and they vary in number and size. When clearly defined, they are always superficial. The small ones are linear and lie close to and parallel with the arterioles. When deeper they are more rounded. The blood in these hemorrhages comes from the capillaries and is mainly due to capillary stasis. It may lie between any of the retinal layers.

There may be white patches, varying in color from white to yellow, and in size from small punctate ones to those approximating the size of the optic discs. They have the same fundamental cause as have the hemorrhages and are most commonly seen in the areas between the macula and the disc and just below the disc. The hazy ones are called "cotton-wool patches" and are probably areas of superficial edema. These may be later entirely resorbed. There may also be "hard," clean-cut patches, which are probably cystoid spaces containing exudates of a colloid material staining like hyaline and droplets of lipoid material either free or engulfed in phagocytes. The glistening white deposits seen occasionally around the macular region are probably mainly fats and lipoids. These forms of patches rarely, if ever, disappear.

The distinction between retinitis and neuroretinitis is anything but clear. Probably the main difference is that the latter condition is characterized by haziness or blurring of the discs with hyperemia early and later pallor. In more advanced stages there may be a true edema of the discs, a group of exudates arranged like a star around the macula, more hemorrhages, greater narrowing of the arterioles, and more distension of the veins. Therefore, although my opinion may be open to question, I believe that neuroretinitis is nothing more than an advanced stage or an exaggeration of retinitis.

This brings up the point of two terms heard sometimes; namely, "retinitis of benign hypertension" and "retinitis of malignant hypertension." Although these terms are frequently used and I have often used them myself, I do not believe that they constitute an important differentiation. If neuroretinitis is nothing more than an advanced stage of retinitis, it is not difficult to suppose that more severe retinal involvement may indicate more severe vascular disease, and less severe involvement, less severe disease. However, the distinction in terms is not of great clinical importance.

It has been stated that neuroretinitis is more indicative of the onset of renal insufficiency in cases of hypertension, but I do not believe so. It may be true that neuroretinitis is more common in cases of very severe vascular disease in which impairment of renal function is more likely to ensue. But, as a matter of fact, in most of such cases of severe essential hypertension in which neuroretinitis is present, death is due to general visceral failure. That is, there is a more or less simultaneous failure of all of the vital organs due to severe, generalized vasoconstriction, and these patients die of this general failure before they have time to develop absolute renal failure alone.

The onset of retinitis and neuroretinitis is probably due to a sudden increase in the degree of constriction of the arterioles. When vasoconstriction is slow and progressive they do not develop, but a sudden vascular spasm will bring them out. I hold this belief because I have observed that retinitis and neuroretinitis are more common in so-called hypertensive crises in which there is a sudden, extreme rise in the blood pressure of a hypertensive patient, and that after the hypertensive

crisis subsides the retinitis may disappear, leaving only those vascular changes that are certainly permanent.

Nephritis

Here again, in the discussion of nephritis, it is important that we have somewhat the same ideas about the subject we are to discuss. Aside from the renal infections and the so-called surgical diseases, there are three main groups of kidney diseases. These are as follows: (1) Diffuse glomerulonephritis, which is subdivided into acute, subacute, and chronic forms, each of which presents a definite clinical picture and course; (2) kidney diseases characterized by tubular degeneration, the so-called nephroses, this group being subdivided into lipoid nephrosis, amyloid disease of the kidneys, nephrosis of pregnancy, and the nephrosis associated with bichloride-of-mercury poisoning; (3) degenerative vascular diseases, of which the only important one is renal failure due to renal arteriolosclerosis, the result of long-continued essential hypertension.

In the chronic form of glomerulonephritis and in the late stages of the subacute form there is regularly hypertension that is frequently rather severe. There may be some hypertension in the acute form of glomerulonephritis, but in nephrosis it is rarely seen. In the degenerative vascular type of kidney disease which has been named, there is practically always hypertension.

Glomerulonephritis is probably a disease of the arterioles in general as well as of the kidneys. Nephrosis does not involve the blood vessels generally. It is only in cases of renal disease in which there is hypertension that we see retinitis and neuroretinitis, the fundamental cause of which is the same as in essential hypertension. Therefore, insofar as I can tell, the retinal pictures of essential hypertension and renal disease with hypertension are practically indistinguishable, so that the ophthalmologist should not be called upon to make a differential diagnosis on the basis of the retinal examination alone. He should have all of the information that the internist can summon to his aid before he can be expected to give an opinion that a certain retinal picture is or is not that of nephritis.

Neuroretinitis may be an early sign of renal failure, but it never occurs until late in the course of kidney disease, so that it is really an early sign of impending death. The degree of renal failure must be great before it is seen, and, of course, it adds gravity to the prognosis. However, one is not infrequently surprised by having patients suffering from renal disease and in whom retinitis is present live on for years. This is more often true when the fundus picture is not so advanced as to deserve the designation, neuroretinitis.

The terms "albuminuric retinitis" and certain others should be discarded. Albuminuria has nothing to do with retinitis.

There are occasional cases of severe renal disease in which there is very little retinal involvement.

Pregnancy

Many ophthalmological disturbances may occur during pregnancy. Some of them are night blindness; retinitis pigmentosa; temporary contraction of the visual fields; hemorrhagic retinitis of pernicious vomiting of pregnancy; eclamptic amaurosis, in which the pupil reacts to light and which is probably due to edema of the visual centers of the cerebral cortex; and the retinal changes in cases of toxemia with hypertension. In this last condition, again the most important changes in the retina are due to vascular changes of the nature of a generalized arteriolar spasm which affects the retinal arterioles only as part of the general constriction.

We also see pregnant patients who show organic vascular changes of the type described under essential hypertension. In such cases, it is probable that there was preëxisting essential hypertension or chronic glomerulonephritis and that the pregnancy has increased the spastic manifestations and thereby caused retinitis. These spastic changes are usually functional in the beginning, but as pregnancy continues they become organic and irrevocable. In such

cases the prognosis for vision is good, but the prognosis for good health is poor. In general, it may be said that the earlier in pregnancy the retinitis appears, the poorer is the outlook for a live baby, and the greater is the danger of permanent vascular injury even though there was no previous evidence of hypertension. Nevertheless, there are many cases in which retinitis does not recur with subsequent pregnancy.

Heart disease

Vascular changes play an important part in the retina in cases of heart disease. Some time ago I had the opportunity to study with Henry Wagener 137 cases of heart disease examined during life and at necropsy.* In this group were most of the main etiologic types of heart disease, as follows: (1) chronic rheumatic endocarditis; (2) heart disease due to hypertension, one of the commonest causes of heart disease; (3) heart disease due mainly to coronary arteriosclerosis with or without hypertension; (4) heart disease due to syphilitic aortitis with aortic regurgitation; (5) heart disease due to hyperthyroidism, this being included as a main type because its recognition and proper treatment may lead to cure of the heart failure.

In the 137 cases that we studied it was only in hypertensive heart disease, in heart disease due to coronary arteriosclerosis, and in subacute bacterial endocarditis that the fundus picture gave help in diagnosis, but this help was considerable. In 96 percent of cases of heart disease due to hypertension alone there were changes characteristic of the disease in the retinal arterioles. In the other 4 percent of cases there were no detectable vascular changes in the retinae. Therefore, in hypertensive heart disease the retinal examination is important and particularly so in those cases in which the blood pressure has returned to normal. In this type of case we need aid, and the retinal findings may constitute the final diagnostic criterion.

In 92 percent of cases of heart disease due mainly to coronary arteriosclerosis there were retinal vascular changes either of the hypertensive type or of the senile fibrosis type. In this connection it should be remembered that about 50 percent of all cases of hypertensive heart disease develop coronary arteriosclerosis.

From these findings we concluded—and further clinical experience substantiated the idea—that retinal arteriolosclerosis in the presence of heart disease means that the heart disease is due to either hypertension or coronary arteriosclerosis or both, always provided specific evidence of other causes is absent; and that, if the retinal changes are of the type associated with decrescent arteriosclerosis and there is no clinical evidence of another cause of heart disease, the heart disease is probably due to coronary arteriosclerosis alone. Furthermore, if neither type of vascular retinal change is present, the chances are against the heart disease being due to either hypertension or coronary arteriosclerosis.

The presence of retinitis or neuroretinitis in cases of heart disease was found to add gravity to the prognosis and indicated a shorter duration of life.

The only other form of heart disease in which retinal examination is a diagnostic aid is subacute bacterial endocarditis, in which petechiae with white centers may be seen.

Conclusions

In the great majority of cases of retinal vascular change and so-called retinitis and neuroretinitis, no matter what systemic disease may accompany them, the fundamental cause of such alterations is probably mainly generalized, organic, vascular disease or arteriolar spasm or both. It is admitted that other factors, unknown at present, may play a role in the production of retinitis and neuroretinitis, but these are probably of minor importance. It is probably impossible from the ophthalmologic examination alone to determine whether retinal changes are due to essential hypertension with or without renal failure or to nephritis.

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FAMILIAL CORNEA PLANA, COMPLICATED BY CATARACTA NIGRA AND GLAUCOMA

HANS BARKAN, M.D., AND W. E. BORLEY, M.D.
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Cornea plana is that condition in which the radius of curvature of the anterior portion of the eyeball, specifically the cornea, is the same as that of the eyeball. Three cases in one family—mother and two daughters—are described individually. In both daughters was present the indistinct corneal opacity extending from the corneo-scleral margin into the corneal tissue described by Swett. A table gives corneal measurements and errors of refraction in four members of the family for purposes of comparison. From the Department of Ophthalmology, Stanford University Medical School. Read before the Pacific Coast Oto-Ophthalmological Society in Portland, Oregon, May, 1935.

The condition called cornea plana has received little attention in ophthalmic literature because of its rarity as a clinical entity. The modern textbooks of ophthalmology, except de Schweinitz's, do not mention it in their latest editions, so we may conclude that it is a condition rarely seen and therefore little understood. It is for these reason that we feel justified in reviewing the literature and reporting the following three interesting cases, all in the same family.

First mention of the condition was made by Rubel[1] in 1912. The familial aspect is immediately noticed by the fact that Rubel described the condition in three brothers, all of whom showed the picture that we now know to be characteristic of cornea plana. Rubel noted a striking flatness of the anterior half of the eye and that the cornea resolved itself into scleral tissue at its periphery without the formation of the usual angle at the limbus. There was also noted the white, parenchymatous, circular opacity of the cornea, the embryotoxon. The anterior chamber was shallow; the iris surfaces showed a very minimal development of the smaller iris circle. There was marked hypermetropia, vision ranging from 2/10 to 6/10. One brother had had interstitial keratitis at the age of ten; the Wassermann reaction was negative in the two other brothers and in this brother's case was not obtainable. Recognizing the general congenital and familial character of the disease and the fact that it did not fall under the nomenclature of microcornea, with or without microphthalmus, he proposed for this disease the title "congenital familial flatness of the cornea." Since 1921, the term "cornea plana" has been used as most descriptive of this condition.

Since Rubel's first report there has been considerable confusion as to what constitutes cornea plana, and there is no doubt that many cases of microcornea and microphthalmus have been erroneously described as cases of cornea plana. In the English literature only one article is to be found, that of Swett.[2] He reports a case of cornea plana in a child, giving measurements and showing photographs. The few additional cases on record[3] are for the most part of German authorship, the best article probably being that by Friede, in 1921.

From our meager supply of information we may formulate the definition of cornea plana as "that condition in which the radius of curvature of the anterior portion of the eyeball, specifically the cornea, is the same as that of the eyeball." This is based primarily on anatomical findings and measurements of the bulbi and cornea cited in the reports just mentioned and in the cases that we are reporting. It must be a developmental anomaly of the anterior mesodermal segment of the bulbus that is clearly shown to be hereditary and familial. Each case in our series will be described individually.

Case 1. S. H., aged 41 years, an unmarried female housekeeper, was seen on March 2, 1934, with a history of having noticed halos around the lights seen with the right eye over a period of many years, worse in the last year and a half. The vision had failed rapidly during the past year and there was pain in the right eye. She remembered having had attacks of pain with blurred vision and halos as long as eighteen

Fig. 1 (Hans Barkan and Borley). Familial cornea plana, case 1, in a daughter.

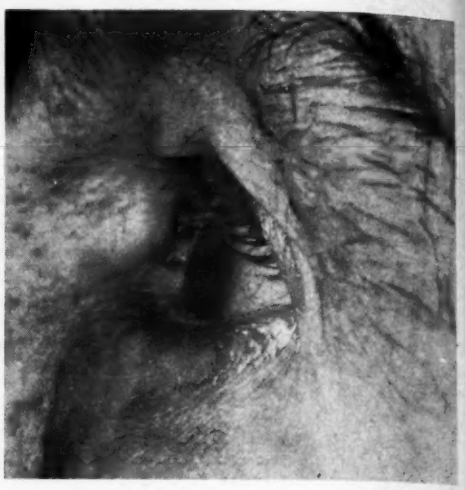

Fig. 2 (Hans Barkan and Borley). Familial cornea plana, case 2, in the mother.

years ago. She had been given drops to use in the right eye seven months ago.

Examination: Vision in the right eye, no light perception; in the left eye, 20/30. There was moderate ciliary injection of the right eye with steamy cornea, shallow anterior chamber, complicated cataract, invisible fundus. Tension right eye was 3+; in left eye 1+. The left eye showed no injection. The finding of interest, however, was the flat cornea of both eyes. The normal curvature was not present, and in profile the cornea was seen to have the same curvature as the sclera. Starting from the corneo-scleral margin and extending inward for one millimeter in the corneal tissue, was an opaque epaulet or arcus of fibrous tissue with blood vessels extending from the limbus about one millimeter over the clear part of the cornea. This has been described in the case reported by Swett. The fundus and fields of the left eye were normal.

Iridectomy was performed on the right eye for relief of pain. The postoperative course was uneventful and the tension has remained normal in the right eye. The patient was placed on 1-percent pilocarpine for the left eye, three times a day. Measurements taken of the cornea in this and the other cases are given in table 1.

Tension of the left eye was controlled with pilocarpine until March, 1934, when it was found to be 54 mm. Hg (McLean). The patient reported having had halos and blurred vision. In April, 1934, an iridectomy was performed on the left eye and on her last visit in May, 1935, both eyes were of normal tension and the patient was free of symptoms. Figure 1 is a photograph of this patient's left eye.

Case 2. Mrs. H., the mother of S. H.,

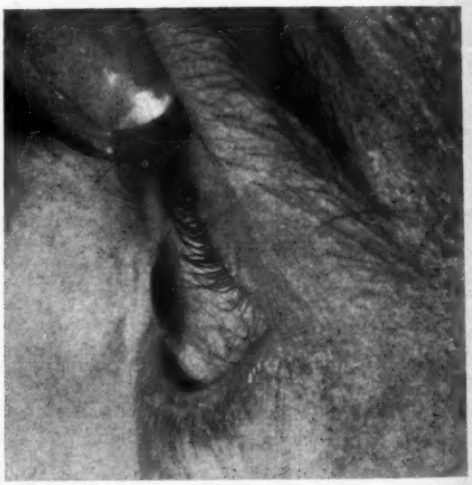

Fig. 3 (Hans Barkan and Borley). Familial cornea plana, case 3, in another daughter.

aged 77 years, was seen on September 11, 1934, and gave a history of having had cataracts for eight or ten years, with extraction in the right eye eight years previously followed by good vision for four years: it then failed and became progressively worse. The oculist who had operated on her right eye told her at the time that the operation was very difficult due to the large size of the lens.

Examination: Vision, hand movements in the right eye, light projection temporally only. The corneae were flat. The right cornea showed scattered opacities and an irregular epithelial surface, definite signs of corneal degeneration. Operative coloboma of the iris was present. The fundus was not seen. The flatness of the cornea on the left side was more noticeable due to its clearness. The anterior chamber was shallow, the pupil active. A mature cataract of chocolate-brown color was present and prevented fundus examination. Corneal measurements are given in table 1. Extraction was performed in the left eye after an incision had been made under a Spratt flap and the wound edge enlarged with scissors, on the temporal side. A large flap was prepared to preserve the circulation of the cornea as far as possible, in view of the degenerative changes on the other side. No difficulty was encountered in expressing the lens, which was found to be of normal size (9 x 5 mm.). The postoperative course was uneventful, and in six weeks vision with correction of +9.0 D. sph. ⌯ 4.0 D. cyl. ax. 180° was 20/50 (at the last visit in November, 1934). The eye was soft, the cornea clear, and the patient happy with her vision. Microchemical analysis of the cataractous lens, which was almost black in color, revealed neither blood pigments nor melanin.

Case 3. Mrs. G. B., sister of S. H. (case 1), aged 46 years, was first seen September 28, 1934. She gave a history of having worn glasses since she had reached the age of fourteen years.

Examination: Vision in the right eye was 20/20 with a +2.25 D. sph. ⌯ 1.25 D. cyl. ax. 120°; in the left eye, 20/20 with +2.0 D. sph. ⌯ 2.0 D. cyl.

Table 1

CORNEAL MEASUREMENTS AND REFRACTIVE ERRORS IN THREE CASES OF FAMILIAL CORNEA PLANA

	Age	Corneal Diameter				Refractive Power Cornea		Radius of Curvature	Refraction	Tension	
		Horizontal		Vertical		Diopters		Millimeters Mean		McLean	
		Right	Left	Right	Left	Vertical	Horizontal			Right	Left
Miss H.	42	10.5	10.5	10	10	R 32.5 D L 36 D	R 38 D L 36.5 D	9.5	O.D. Blind O.S. +6.5 D. sph. ⌯ 1.0 D. cyl. ax. 150°	40	45
Mrs. H.	77	11	11	10.5	10	L 37 D	L 33 D	10	O.D. +7.0 D. sph. ⌯ 8.0 D. cyl. ax. 180° O.S. +9.0 D. sph. ⌯ 4.0 D. cyl. ax. 180°	28	20
Mrs. B.	46	11	11	10	10	R 37.5 D L 37.5 D	R 36 D L 36 D	9.5	O.D. +2.0 D. sph. ⌯ +1.25 D. cyl. ax. 120° O.S. +2.0 D. sph. ⌯ +2.0 D. cyl. ax. 75°	30	28
Mrs. J.	54	11.5	11.5	11	11	R 42 D L 43 D	R 40 D L 41 D	7.9 to 8.5	O.D. +2.75 D. sph. ⌯ +1.50 D. cyl. ax. 90° O.S. +2.50 D. sph. ⌯ +0.75 D. cyl. ax. 90°	30	30

ax. 75°, Jaeger 1 with +2.0 D. add. As in the other cases, the flatness of the corneae was quite evident. They also appeared to be somewhat smaller in diameter. There was the same indistinct opacity extending from the corneo-scleral margin into the corneal tissue. In spite of the apparent smallness of the corneae, actual measurements did not reveal any marked deviation from the normal (see table 1). There were bilateral, incipient, posterior cortical opacities in the central areas of the lens; the tension and fundi were normal. A comparison of the corneal measurements and the refractive errors in these three cases are given in table 1. A third sister (Mrs. J. in the table) did not show any of these abnormalities. The grandchild of this sister, however, has a convergent strabismus. Examination of the anterior-chamber angle with the gonioscope by one of us did not show any pathology.

Few cases of this disease, as stated before, have been reported but those reported have been correctly described with accurate measurements of the corneal diameters, amount of astigmatism, conditions of refraction, and vision. The account of Wilber Swett, the only reference to the disease in English, gives all the essential and typical features although reporting only one case. Our cases are valuable in enriching the literature by another group of familial cornea plana. The incidence of glaucoma in cornea plana is consistent with its occurrence in other congenital malformations of the eye, such as microphthalmus and buphthalmos. In a group of microcornea cases, observation by Stahle showed that nine in fifty, or twenty percent, were complicated by glaucoma. The distinction between microcornea and cornea plana is simple. In genuine microcornea the cornea is never flat and the angle of junction between the cornea and sclera is normal. The embryotoxon is also absent. Cornea plana is characterized by the fact that the anterior bulbus is flat, the cornea flat and that there is no evidence of the angle at the junction of the cornea and sclera. The anterior chamber is shallow and the embryotoxon is usually present. The embryological maldevelopment in cornea plana occurs probably at about the third to fourth month of fetal life when the differentiation between the sclera and the stratified epithelium of the cornea takes place.

Clinically and practically, patients with cornea plana can be told that: (1) the condition is familial; that is, if one child has it, other children will be apt to have it; (2) as it is probably a dominant, inheritable characteristic, patients contemplating marriage should be told that the children may have it; (3) glaucoma may be a complication.

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SYNTHETIC SUPRARENIN BITARTRATE AS A MYDRIATIC

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The historical and physiological aspects of the adrenalin family as used in ophthalmology are reviewed. While the pressure-lowering effect is briefly discussed, emphasis is laid upon the mydriatic action of epinephrine compounds. The authors report a series of seventy-four cases in which the pupil-dilating effect of laevosuprarenin bitartrate (synthetic) was studied. Speed of dilatation, duration, and the contrary effects of miotics upon the pupil were recorded and conclusions drawn. From the Department of Ophthalmology, University of California Medical School. Read before the Eye, Ear, Nose and Throat Section of the California State Medical Society, Yosemite Valley, May 25, 1935.

The principal effects of epinephrine upon the eye have have been known for a long time. In 1904, Henderson and Starling[1] stated that intraocular tension depends upon pressure within the intraocular blood vessels. They observed that the effect of adrenalin on the eye varied according to whether the local or general effect on the blood vessels predominated.

In 1911, Rollet and Curtil[2] observed that adrenalin sometimes produced a surprising fall in intraocular tension. Erdmann,[3] in 1913, found that posterior synechiae which defied atropine might be pulled loose by the use of subconjunctival injections of epinephrine. Knapp,[4] in 1921, pointed out that by adrenalin the eyes of glaucomatous patients might be dilated sufficiently for ophthalmoscopic examination with little danger of increasing the intraocular tension.

In 1923, Hamburger's articles[5-9] began to appear, leading to the description of "glaucosan" about three years later. This was a synthetic dextrorotatory epinephrine which had all of the dilating, pressure-reducing power of ordinary laevorotatory epinephrine, but less than half its general systemic effects. It was injected subconjunctivally. Later, a concentrated 2-percent suprarenin solution in combination with an optically inactive suprarenin appeared called "laevoglaucosan" on "Linksglaucosan." This was effective as drops in the conjunctival sac but could not be injected. Although a powerful dilator and pressure reducer, glaucosan was prohibitive in cost. It also induced a microscopic whitish granular deposit on the cornea. Thiel,[10] in 1924, suggested the use of epinephrine bitartrate, 1 to 100, in ointment form.

Gradle[11] found that a small wick of cotton saturated with stock adrenalin and tucked up under the upper lid for a few minutes produced as much effect as a subconjunctival injection.

Green[12] found that either adrenalin chloride or epinephrine bitartrate was effective when used as drops in the conjunctival sac, provided they were used in sufficient strength; that is, 1 to 50. These products were not prohibitive in price, caused no deposits on the cornea, and were free from systemic effects. At the instigation of this ophthalmologist, therefore, the H. A. Metz Laboratories put out ampoules of suprarenin bitartrate which, dissolved in 1 c.c. of water, gave a 2-percent solution. This was found by Green to have an effect practically the same as that of laevoglaucosan.

Laevosuprarenin bitartrate is the acid tartrate of synthetic epinephrine obtained by the method of Stolz and Flaecher.[13] It is a white odorless powder soluble in water, the solution being acid in reaction and relatively unstable. It has the chemical and physiological properties of epinephrine obtained from suprarenal glands.

Let us briefly review these physiological properties.

As mentioned above, Henderson and Starling[1] found that intraocular pressure is a function of the blood pressure in the intraocular vessels. The influence of adrenalin upon intraocular pressure varied according to whether the local or general effect upon the blood vessels predominated. The Duke-Elders and Colle[14, 15] in experiments upon dogs'

eyes, intact or isolated, concluded that epinephrine either dilates the minute intraocular vessels or contricts them. The effect depends upon the concentration within the eye. Small concentrations dilate the capillaries and raise intraocular pressure; large doses constrict the intraocular vessels and lower tension. In any dose, it stimulates the plain muscle within the orbit and dilates the pupil. It is now generally conceded that epinephrine in suitable concentration definitely lowers intraocular pressure. Various theories have been offered to explain this effect.[8, 11, 16, 17] That of Wessely is perhaps as good as any.

Wessely, quoted by Knapp,[4] believes that adrenalin causes a vasoconstriction that results in a reduced production of aqueous by the ciliary processes. He also believes that it has an inhibitory influence upon the secretory cells. By injecting dogs intraperitoneally with fluorescein, the appearance of the dye in the aqueous was slower in eyes treated by adrenalin than in control dogs. Thiel[10] has confirmed these observations with fluorescein in human eyes.

Vasoconstriction with adrenalin is always followed by vasodilatation and some increased intraocular tension. A glaucomatous attack may be precipitated in exceptional cases, as will be mentioned later.

Mydriasis from epinephrine, according to Post,[17] results from direct action upon the dilator muscle of the iris or upon the sympathetic nerve endings. Yonkmann[18] isolated the iris sphincter muscle from dogs and steers and suspended them in saline solution. Addition of adrenalin 1:1,000,000 served to muscle.

Suprerenin bitartrate is an extremely useful drug in everyday ophthalmic practice. It is not expensive, an ampoule sufficient for 4.5 c.c. of solution costs 75¢, and it is easily procurable. Solutions are not very stable so must be made up fresh about every 15 days. Its mode of use is simple in that it is effective in drop doses. The solution causes burning in the eye and must be preceded by a few drops of local anesthetic, such as holocaine or pantocaine.

In this drug, we have at once a tension reducer and a strong mydriatic. While this paper is chiefly concerned with its use as a mydriatic, a few words may be said concerning its effect in hypertension. Gifford[19] states that cases of chronic, simple glaucoma which are no longer being held by miotics, may be temporarily brought under control by the instillation of suprarenin bitartrate, one drop every 15 minutes three times. There results a definite fall in tension in most cases and the later effect of miotics seems to be enhanced for from 1 week to more than a month. Several of such treatments have controlled tension for as long as one year. Cases unsuitable for operation through the patient's ill health, old age, or fear, may thus be carried along more advantageously.[17] In certain cases of hypertension resulting from prolonged mydriasis, tension may be lowered without the sacrificing of pupillary dilatation.[17]

Where tension reduction is the only consideration, it may be combined with miotics to lessen and shorten the accompanying mydriasis, which occasionally precipitates an acute rise of tension.[16, 20]

While this paper was under preparation, the author had the misfortune to induce a bilateral acute glaucomatous attack in a woman of 55 years by the use of only one drop of suprarenin bitartrate in each eye. In spite of eserine instillation following the fundus examination, tension was acutely high in one eye for 12 hours and in the second, for 36 hours. Tension was finally restored by the repeated use of eserine drops but it was a most unpleasant experience.

In absolute, acute, and hemorrhagic glaucoma, most observers agree that it is ineffective and, in the last two conditions, even dangerous and not to be used. As regards secondary glaucoma, we may accept Vannas's conclusions[21] as summarized by Gifford;[19] namely, that adrenalin is contraindicated in types of glaucoma accompanied by any inflammation and should be reserved for chronic simple glaucoma. Its use as

a mydriatic in iritis is not included, of course, in this statement.

Suprarenin bitartrate and the adrenalin family are unique in that they are the only mydriatics that lower intraocular tension. Thus it is possible to enlarge a pupil for ophthalmoscopic examination in glaucomatous eyes with relative safety. This exceptional behavior is not realized by patients having glaucoma, and we would warn ophthalmologists to explain it carefully before using it. A highly intelligent patient with glaucoma who had read of the danger of dilating the pupils in her disease was terrified to find her pupils enlarged following the ophthalmoscopic examination by a colleague. She never returned to him and believes to this day that she was improperly treated.

The most spectacular effect of suprarenin bitartrate is mydriasis. In this regard, we believe that it is probably unsurpassed in speed and effectiveness. As a primary dilator in cases of acute iritis, its effect is ideal. Old neglected cases of iritis have caused us on occasions to use suprarenin together with a small amount of powdered atropine. This combination breaks up iris adhesions beyond belief!

While much has been written concerning the tension-lowering effect of suprarenin, relatively few studies on mydriasis have appeared. In reported results, Hamburger,[9] Vannas,[21] Gradle[11] and Gredstedt[22] using adrenalin compounds subconjunctivally or as a conjunctival "wick," obtained maximum mydriasis in from 7 to 30 minutes with return to normal pupillary size in from 2 to 72 hours. The adrenalin wick[11] seemed to dilate pupils the most rapidly (7 to 10 minutes) and for the shortest length of time (2 hours).

Despite the rather common use of suprarenin bitartrate (Metz) certain useful information concerning its action upon the normal eye is unavailable. This led us to seek experimental answers to the following questions: 1. How quickly is mydriasis obtained? 2. How long does it last and what dosage will produce maximum dilatation? 3. Will eserine contract a pupil thus dilated? 4. What effect upon the pupil has suprarenin and eserine when used together? 5. Are there any untoward effects?

Our observations were made for the most part at a home for the aged infirm. We used 74 patients in all. The average age of the patients was 64 years and they had normal eyes except for arteriosclerosis and ammetropia.

In all cases, 2 drops of 2 percent butyn was used as a preliminary analgesic. A moderately bright flashlight was held about 8 inches in front of the eyes for fixation and to keep light and accommodation constant. Measurements were made with a vernier caliper held close to the eye.

Our results can be summarized by the following tables:

Table 1

HOW LONG DOES DILATATION LAST FOLLOWING 2 PERCENT SUPRARENIN BITARTRATE?

(a) One drop was applied to 22 normal eyes and caused maximum dilatation in an average of 53 minutes. Maximum size of pupil in two thirds of the cases was 7 mm.; in the remaining third, 5.5 to 7 mm. A dilatation of 6 mm., sufficient for fundus work, resulted in an average of 20 minutes, often in 10 to 15 minutes.

(b) Two drops were used in 43 eyes (with a 5-minute interval between) and produced maximum dilatation in 44 minutes after the first drop. Maximum size of pupil reached 7 to 8.5 mm., but none was less than 6 mm. A dilatation of 6 mm. occurred in an average of 19 minutes after the first drop.

(c) Four drops were instilled in 24 eyes (one drop every 15 minutes for 4 drops). The speed of dilatation could not be measured since the maximum dilatation often occurred before the series of drops was completed. The maximum pupillary size with four drops was no larger in the average than with one or two drops.

Table 2

HOW LONG DOES DILATATION LAST FOLLOWING 2 PERCENT SUPRARENIN BITARTRATE?

(a) One drop applied to 28 eyes kept the pupil above the previously normal size for 8.5 hours (shortest, 3½ hours; longest, 12½ hours). The pupil remained within 1 mm. of its

maximum for 2¼ hours (average). It contracted below 6 mm. in diameter in 4¼ hours (shortest, 1½ hours; longest, 9½ hours).

(b) Two drops in 18 eyes kept the pupil above its previously normal size for 12¾ hours (shortest, 6¾ hours; longest, 16 hours). The pupil remained within 1 mm. of its maximum for an average of 3 2/5 hours (shortest, 2½ hours; longest, 4 hours). It contracted below 6 mm. in diameter in an average of 5 hours (shortest, 3¼ hours; longest, 7½ hours).

(c) Four drops in 20 eyes kept the pupil above its previously normal size for 12 4/5 hours (maximum 16 hours). In some of these cases, blurring of vision was experienced for 1 to 2 hours after the pupil had returned to normal.

Table 3

WILL ESERINE CONTRACT A PUPIL DILATED WITH SUPRARENIN BITARTRATE?

(a) In 20 eyes dilated to the maximum with 2 drops of suprarenin, 2 drops of 0.5-percent eserine solution (one drop every ten minutes) brought the pupil back to normal in an average of 25 minutes. There was often a secondary dilatation of 0.5 to 1 mm. about 30 minutes after the pupil had returned to normal, and this lasted 30 minutes.

(b) In 24 eyes dilated to the maximum with 4 drops, 0.5-percent eserine was instilled 4 times at 15-minute intervals. The pupils returned to normal in an average of 46 minutes after the first drop of eserine. Only 4 out of the 24 eyes showed the secondary dilatation noted in (a). In 21 eyes, the pupil contracted to a size smaller than the original for varying periods up to 5 hours and dimness of vision was experienced.

Table 4

WHAT EFFECT UPON THE PUPIL HAS SUPRARENIN AND ESERINE WHEN USED TOGETHER?

In 24 eyes, one drop of 0.5-percent eserine and 1 drop of suprarenin were instilled every 15 minutes for 4 times. In every case, some dilatation occurred but it was not over 2 mm. and lasted one half to 8 hours. In 50 percent of cases, there followed a secondary contraction of about 1 mm. or less which lasted up to 4 hours.

Table 5

ARE THERE ANY UNTOWARD EFFECTS IN ADMINISTERING SUPRARENIN BITARTRATE?

Headaches occurred in 54 percent of the 74 patients. These were severe in 29, and mild in 11 patients. The headache was always supraorbital and was readily controlled by 10 grains of aspirin. The severest occurred in patients receiving both suprarenin and eserine. In 3 of the 74 patients, vomiting occurred, but these patients were subject to gastro-intestinal upsets. In none of the 74 patients did an acute rise of intraocular tension occur.

Summary and conclusions

1. For ophthalmoscopic work, 2 drops of 2-percent suprarenin bitartrate are sufficient and will not only dilate the pupil as much and as rapidly as a larger dose, but may be easily controlled by eserine. This dosage would seem ample for mydriasis except when iris adhesions must be broken up.

2. The amount of suprarenin has little influence on the speed of dilatation.

3. Mydriasis from 2 drops (12¾ hours) lasts 50 percent longer than from 1 drop (8½ hours). Four drops give the same result as 2 drops.

4. A pupil dilated with 2 drops of suprarenin will return to normal in about 25 minutes if 1 drop of eserine is instilled twice at 10-minute intervals. This safety procedure is recommended in all cases following dilatation for fundus examination. It takes nearly twice as long (45 minutes) to overcome the mydriasis from 4 drops of suprarenin.

5. Headaches are common after administration of suprarenin (54 percent in our series) and are more severe when eserine is used in combination with suprarenin.

6. A combination of suprarenin and powdered atropine is recommended where a supermydriatic is desired.

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THE CAUSE OF VOLUNTARY FORWARD LUXATION OF THE EYEBALL

A case report with anatomical findings at necropsy

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Four cases of spontaneous forward luxation of the eyeball have been reported. Various theories have been advanced suggesting anatomical anomalies whose physiological or functional activities permit such action. In this the first of the four cases to come to necropsy, the right eye only was capable of spontaneous proptosis, and the muscular anomalies described in this article were found only on the right side. The left orbit and its contents were normal in every respect. This is reasonable proof that the anomalies found were the basis of the phenomenon. From the Departments of Anatomy and Ophthalmology of the Medical College of the University of Cincinnati. Read before the American Academy of Ophthalmology and Otolaryngology in Cincinnati, September 17, 1935.

Slight abnormalities of the extrinsic ocular muscles are not exceedingly rare. They are due to developmental errors in cleavage as the muscle differentiates from the common embryologic mesoblastic tissue. These anomalies cause changes in muscle coördination because of varied associations between extrinsic muscles. Certain muscles may be absent, under- or over-developed, or abnormally innervated. A number of authors have described such conditions (Whitnall,[1] 1932).

Voluntary protrusion of the eye in man is rare, complete spontaneous proptosis having been reported but four times.

Horacio Ferrer[2] (1928) reported a case of a Cuban halfbreed boy who, without effort, was able to "dislocate both eyeballs from their orbits and return them to their natural position." Ferrer's explanation of this phenomenon was that the eyeball was forced through the palpebral fissure by contraction of the oblique muscles and relaxation of the recti. It was held in its luxated position by contraction of the orbicularis muscle. The return to the orbit was executed by the relaxation of the orbicularis and the obliques.

Another case was reported by J. Allen Smith[3] (1932). His was that of a negro boy who could protrude one or both of his eyes without apparent discomfort or effort. At first he had to use his fingers to proptose his eyes but, with practice, this was no longer necessary. Smith was inclined to accept Ferrer's explanation of the mechanism of this act.

A. Almeida[4] (1932) presented a brief bibliography of the few reported cases of complete luxation of the eyeball, most of them resulting from trauma. He mentioned the fact that spontaneous proptosis of the eye occurs apparently exclusively in the colored race and he suggests that shallow orbits with relaxation of the "ligaments," especially the "tarsal ridge," and "peculiar abilities" were necessary adjuncts to this phenomenon. Almeida did not believe that oblique-muscle action was sufficient to cause complete proptosis and mentioned the infrequency of its occurrence even in marked Basedow's disease with exophthalmos. Two cases were reported.

Other authors have presented cases of voluntary exophthalmos with a traumatic or pathologic cause which are not pertinent to this presentation. Birch-Hirschfeld[5] (1907) gave a classification of the causes of exophthalmos as follows:

A. Protrusio bulbi
   1. encroachment on the orbital cavity
   2. diminished retraction of the eyeball (including paralysis of muscles supplied by the oculomotor and facial nerves)

B. Protractio bulbi
   1. increased protraction of the oblique

Fig. 1 (Lyle and McGavic). Voluntarily proptosed right eye held in protracted position by contraction of the palpebral orbicularis muscle.

2. stimulation of the sympathetic system

Class A has a traumatic or pathologic cause which is not relevant to the subject. Class B indicates (1) a voluntary and (2) an involuntary means of proptosis. The voluntary cause will be discussed later. Due to its rudimentary state the sympathetic innervated smooth muscle in the orbit of man cannot play a part in the protraction of the globe. In lower animals (for example the rabbit) the orbital muscle of Müller acts as a protruder of the eye. But in man this muscle is so poorly developed that its stimulation has no effect upon the movements of the eye whatsoever (Duke-Elder,[6] 1933). The periorbital musculature, also smooth muscle, innervated by the sympathetic, is said to play a part in exophthalmos (Landstrom,[7] 1908) but the muscle is involuntary and appears to be of slight functional value in man.

The extrinsic ocular musculature is divided into two tractor groups. The four recti are regarded as retractors. These are antagonized by the two obliques which, because of their action, are protractors. This setup "is probably the active element in maintaining the equilibrium of the globe" (Theobold,[8] 1918). It is therefore reasonable to assume that if the protractor element is increased so that it can more than equalize the retraction action of the recti, forward luxation can be accomplished. In the case we report, such additional action is produced by an extra oblique muscle with apparent primary protractor function. The action of this additional muscle combined with that of the superior and inferior obliques overcomes the retractor opposition of the recti muscles and produces complete proptosis. The eye is held in this protracted position by contraction of the orbicularis palpebrarum as seen in the photographs (fig. 1).

A second, less unusual, anomaly is found in this same case in the association of the superior rectus and superior oblique by a strong musculo-tendinous union as here described and pictured (fig. 2) so that the retraction of one muscle disturbs the normal function of the other at the same time impairing its antagonistic action.

Case report. The case presented is that of a colored man (fig. 1) who has made his living in recent years by his ability to luxate his eye out of its socket. Ripley presented him in his "Believe It or Not" sketches in the newspapers. This man was also seen at the "Odditorium" in the recent Chicago World's Fair and at many smaller stands throughout the country. While

on exhibition in Cincinnati, this spring, he died of pneumonia and it was our good fortune to study the case at necropsy.

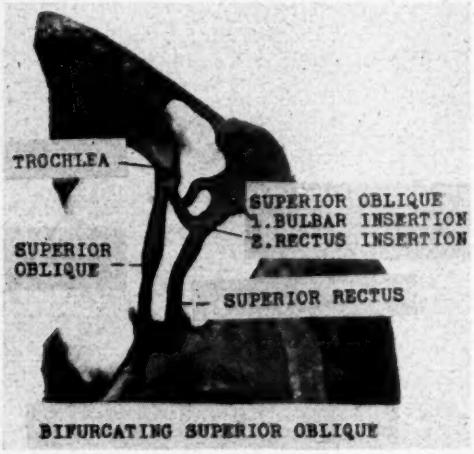

Fig. 2 (Lyle and McGavic). Musculotendinous union of superior oblique with superior-rectus muscle.

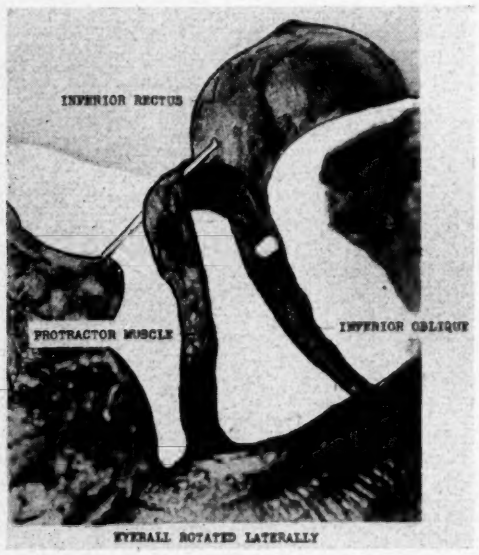

Fig. 3 (Lyle and McGavic). The extra oblique muscle showing its origin, size, and position relative to the inferior-rectus and oblique muscles.

Not having seen the subject on exhibition we thought it best to write Ripley for any information he could give us. His reply, in part, is as follows: The "pop-eyed man . . . told me personally that his unique ability to pop the eyeball out of the socket was discovered one day when he was making faces for the amusement of his little sister. She screamed at him, and upon looking in a mirror he found his eye literally hanging out. He did not suffer pain and tried again. Finally he made his living doing just that." The photographs which were inclosed with the letter showed a proptosis of the right eye only. The ability to protrude the left eye was not present. Upon careful dissection the musculature of the left orbit was found to be perfectly normal in every respect.

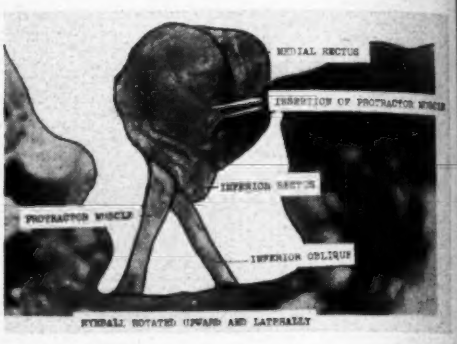

Fig. 4 (Lyle and McGavic). The eyeball turned upward and torted clockwise to show the insertion of the extra oblique muscle.

An approach to the orbits was made from above after removal of the brain. The right orbit was investigated first. Better observation was obtained for careful dissection by removing most of the lateral and nasal bony orbital walls, retaining the rim with its attachments of oblique muscles and check ligaments. The periorbitum was then opened and the muscles bluntly dissected out and measured.

The first anomaly to be noted was that the superior-oblique muscle bifurcated just after leaving the trochlea (fig. 2), the lower branch going to its normal insertion in the globe, the upper branch passing obliquely backward and outward to join the superior-rectus muscle, 10 mm. behind its normal insertion in the eyeball. With this exception, both muscles, as, in fact, all of the extrinsic muscles, were normal in size, length, origin, and insertion (table 1).

The median and lateral recti had well-developed check ligaments.

When the lower part of the orbit was explored we found, besides the normal inferior rectus and inferior oblique, another well-developed oblique muscle lique beginning at the mesial edge of the latter (5.1 mm. from the optic nerve) and extending in a slightly curving line past the optic nerve and two millimeters below it to terminate on the nasal side of the eyeball about five

Table 1

COMPARISON OF CERTAIN OCULAR MEASUREMENTS IN THIS ANOMALOUS AND IN THE AVERAGE NORMAL EYE

	Length of Muscle		Width of Insertion		Distance of Insertion from Cornea	
	This Case	Normal Average*	This Case	Normal Average	This Case	Normal Average
Median Rectus	40 mm.	all	9 mm.	10 –11 mm.	7.0 mm.	5.5– 7.0 mm.
Inferior Rectus	41 mm.	about	10.5 mm.	9.8–10.3 mm.	6.5 mm.	5.5– 8.0 mm.
Lateral Rectus	40 mm.	forty	9.5 mm.	9.2– 9.7 mm.	6.2 mm.	6.7– 7.2 mm.
Superior Rectus	42 mm.	mm.	10 mm.	10.6 mm.	7.2 mm.	6.5–11.0 mm.
Superior Oblique	39 mm. 21 mm.	40 mm. 20 mm.	11 mm.	7.5–12.7 mm.	18.0 mm.	13.8–18.8 mm.
Inferior Oblique	38 mm.	37 mm.	7 mm.	10 mm.	21.0 mm.	17.3–19.1 mm.
Extra Oblique	42 mm.	—	8 mm.	—	21.5 mm.	—

	Size of Eyeball		Size of Orbit	
	This Case	Normal Average	This Case	Normal Average
Ant.-Posterior	25 mm.	24.15 mm.	44 mm.	39–50 mm.
Transverse	27 mm.	24.13 mm.	40 mm.	36–50 mm.
Vertical	27 mm.	23.48 mm.	36 mm.	30–40 mm.

	This Case	Normal Average
Length of Optic Nerve	50 mm.	45–50 mm.

* From a number of standard textbooks of anatomy.

(fig. 3), 42 mm. long, which had its origin just behind the orbital tubercle. This muscle was fused, at its insertion, with the lateral check ligament and joined in its temporal fourth by fascia from the septum orbitale. It passed between the inferior-oblique and inferior-rectus muscles to terminate in a tendinous insertion, eight millimeters wide, in the posterior part of the globe (fig. 4). The line of insertion was continuous with that of the inferior ob- millimeters from the posterior pole of the eye.

It might be necessary to differentiate this muscle from a check ligament of the inferior oblique which was described by Motais, Charpy and Maddox as a fascial strand passing laterally from the muscle sheath to the floor of the orbit. This was called the "septal bridge" by Virchow. Whitnall (1932) found this fascial "rarity" but once in many dissections.

Conclusions

The action of this additional muscle appears to be mainly that of protraction with secondary actions of adduction, intorsion, and possibly elevation. The nerve supply is questionable. From what we could determine it appears to be from the abducens.

If this muscle were to be given a name it might be called the temporal (oblique) protractor to associate it with the two nasal protractors, the superior and inferior obliques.

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DINITROPHENOL CATARACTS WITH SIGNS OF TETANY

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A case is presented in which obesity had been corrected by the use of dinitrophenol. Cataract developed in each eye after eleven months of medication. Within six weeks almost complete liquefaction of the cortex had occurred. The patient at the end of her medication developed clinical and serological symptoms and signs quite suggestive of parathyroid tetany. Read before the College of Physicians of Philadelphia, Section on Ophthalmology, October 17, 1935.

The case to be presented is, I believe, one of chronic dinitrophenol poisoning, in which the outstanding pathological findings are those of sudden and extensive lens changes. This chemical compound, also known as alphadinitrophenol, is chemically, oxy-dinitrobenzene, $C_6H_3(NO_2)_2OH(2:4:1)$, made from phenol, nitric and sulphuric acids by heat (HNO_3 and H_2SO_4), and is a yellowish crystal or powder readily soluble in water at body temperature, with a melting point of 113°C., and with a pH of 2.0 to 4.7. It is used for the manufacture of azo and sulphur dyes, as a preservative for timber, and for the manufacture of picric acid and of diaminophenol—also it is used as an indicator for preparing various stock solutions. No pharmaceutical house will, in its literature, speak in any way of its therapy nor of its action. This includes even the most reputable houses.

For quite some time, this chemical has been used for the reduction of weight in obesity. Apparently, this is the result of a tremendous increase in body oxidation; that is, in tissue oxidation. It may also be said to induce a great increase in the rate of metabolism. Just how this occurs is apparently unknown, except that there seems to be no great stimulation of the thyroid gland; at least no other signs seem to suggest thyroid overstimulation. In this case, however, some signs were present slightly indicative of parathyroid deficiency. That cataract changes may result from this last condition, i.e., from parathyroid deficiency, is an established fact, and for this possible reason (see conclusions) the case is presented. Dinitrophenol cataract of itself is no longer a rarity; the associated factors in this case, however, are quite distinctive.

The patient was a white female, unmarried, aged 37 years, a professional nurse and physiotherapist. In 1933, her weight was said to be 197 pounds. Her earlier medical and gynecological his-

tory was wholly irrelevant. In September of 1933, she started taking dinitrophenol—took several doses of three grains each, and one dose of 15 grains, when she became violently and suddenly ill with nausea and vomiting, and developed a general physical condition approaching collapse. She had a marked rise in temperature and the weakness persisted for several additional days. She stopped the drug and shortly afterwards started on strenuous physical and gymnastic exercises, without, however, realizing any reduction in weight. In October of 1933, the patient again started taking dinitrophenol, in spite of her earlier experiences, and this time she did not develop the symptoms that had appeared before. Her dosage was 3 grains daily. In eleven months she had consumed about three ounces of this drug. In September of 1934, the patient discovered that her vision was not so satisfactory as before. She reported to an oculist in Washington, D.C., who ordered glasses for her, but who made no other comments about her eyes. The drug was continued and in January of 1935, the patient's weight was about 130. In December of 1934 the vision suddenly became very poor, and on January 21, 1935, she reported to another ophthalmologist. The vision was then only bare light perception in the left eye while in the right it was but slightly better. The major portion of this decrease in vision had occurred over a period of the previous six weeks —for in this interval the vision had failed from the ability to read in each eye, though with some difficulty unless the illumination was very good, to, as has been said, a bare light perception. The patient was told to stop the drug immediately, she was placed upon strychnine and arsenic, and was given a patented vitamin-A preparation. By March of 1935, her weight had increased to 149 pounds.

The patient was first seen by the writer on March 14, 1935. Her vision was then a fair light perception and projection in the right eye; this was poor in the left eye, light projection being referred almost wholly to the dominant temporal field. The ocular tension, Schiötz, was 12 and 14 mm. of Hg, respectively. She was blue eyed, with healthy irides, normal corneae, very shallow anterior chambers, and without signs of superficial irritation. Her lenses presented a most interesting picture, both approximately the same, except that the changes seen and described were more extensive in the left eye.

The lens was replaced by a sac of lens capsule. Considerable lens debris floated in the milky liquid contents of this sac, much of it a yellowish chalk-

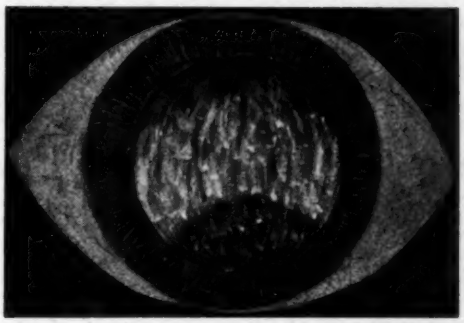

Fig. 1 (Spaeth). Dinitrophenol cataract.

like material. No crystals were seen of any type or variety. The particles floating freely in the liquid changed their position constantly with the movements of the eyeball. In the lower part of this liquid-filled sac was the firmer, still conglomerate, brownish-tinted nucleus. This, also, changed its position with the movements of the eyeball, and with changes in the position of the patient's head (fig. 1).

By the history and through our own observations we discovered that temperamentally the patient had changed from an active, alert, energetic individual to one who was now morose and introspective, who wept a large part of the time, usually quietly, and with considerable lacrimation, and at other times sobbed so that she could not speak. Her physical state, that is, the cataracts and the necessary surgery she was facing, did not seem to be of any concern to her—nor did it seem that this was the cause of her depression. She complained of various pains but was unwilling or unable to describe or

explain them.

Neurological examination showed normal pupillary responses, and normal extraocular motility. There were no cranial-nerve palsies. The power in the arms and the forearms was good. There was no incoördination. The reflexes were variable, but generally hypoactive. Deep sensibility was diminished. The knee jerks were present, the left more active than the right. The ankle jerks were both present, the left restricted, however, by an old nonrelated deformity of the foot. The vibration sense was remarkably impaired. There was a marked disturbance of the sense of position, but no disturbance of pain nor of touch was elicited.

Preoperatively her blood calcium was 11 mgm. per 100 c.c. Her blood sugar was 78 mgm. per 100 c.c. and the urea N_2 was 10 mgm. per 100 c.c. Her urine on analysis had a specific gravity of 1.021 with a faint trace of albumen. Her P. S. P. kidney function, after intravenous injection, was 50 percent the first half hour, 10 percent the second, 4 percent the third, and 4 percent the fourth half hour. Her Fishberg was 1.011, 1.012, 1.013; the amounts of urine for which, respectively, were 530 c.c., 290 c.c., and 145 c.c., hourly samples. Cultures from the conjunctival cul-de-sacs were sterile after 48 hours of incubation, except for a few Hoffmann bacilli.

Her blood count showed four million red cells, with a 68 percent hemoglobin, 64 percent of polymorphonuclears, and 36 percent of small lymphocytes.

Under avertin anesthesia, because of her unstable mental state, a capsulotomy was performed with toothed forceps, followed by simple irrigation, removal of the lens debris and of the small, shrunken, brown-stained, crenated lens nucleus. In each eye, a peripheral iridotomy was made with a knife needle. The first operation occurred on March 18, 1935, and the second on March 27th. The ocular postoperative recovery was rapid and uneventful. Four weeks later, the patient was corrected to 6/5 vision in each eye with plus 12 D. spheres approximately, and with small cylinders, axes nearly horizontal. Her fundi were then negative save for a few fine floating vitreous opacities. The slitlamp showed almost transparent fibrils of lens capsule, no cortex, and a normal vitreous without herniation through the intact sphincter irides.

Her blood calcium dropped from its preoperative value to 10 mgm. per 100 c.c. on March 23, 1935, to 9 mgm. per 100 c.c. three days later, and to 7 mgm. per 100 c.c. on the 27th, rising to 10 mgm. on the 29th and to 11.5 mgm. on April 3d. During this time, her blood phosphorus was 3 mgm. per 100 c.c. March 23d, 2.8 mgm. per 100 c.c. on the 27th, and 5 mgm. per 100 c.c. on April 3d. Because of postoperative symptoms that were very suggestive of tetany—increased mental irritability, paroxysmal spasms of the feet and the fingers, twitching of the mouth, and some diarrhea—the patient was placed upon large doses of calcium lactate by mouth, and on cod-liver oil by mouth; on March 21st she was started on alternate-day intramuscular injections of parathyroid extract of .5 c.c. each. She received these on the 21st, the 23d, the 25th, the 27th, the 29th, the 31st, and the last injection on April 2d. At this time she was physically in a very satisfactory condition, again happy and alert mentally, full of plans for her future—the marked apathy of the previous two weeks wholly absent—and she was anxious to return to her home and to work. Subsequent reports have continued to be good in all details. Parathyroid injections were continued by her physician for several additional weeks.

Summary

The case presented shows the following important and interesting factors:

1. Sudden and complete lens-cortex liquefaction, occurring over a period of something less than 15 months, the major portion of the involvement having developed in the last six weeks of this period. The etiological factor seems to have been chronic poisoning from dinitrophenol, a total amount of approximately three ounces having been consumed, i.e., about 1300 grains.

2. The author believes that if one could have waited the necessary length of time these lenses would have gone on to complete, spontaneous absorption, without surgery; the remains of the nuclei still present showing that considerable absorption had already taken place. Economic reasons made early surgery necessary. It is to be regretted that the opportunity for continued observation could not have been granted.

3. Mental changes of apathy (mental instability as well) and other great changes in the patient's disposition were present at the height of the toxication.

4. Kidney function was good, the blood cytology fair, and the blood chemistry normal except for changes in the blood calcium, postoperatively. This describes the time only and not any related etiology.

5. Blood calcium fell definitely, at this time, clinical signs of tetany appeared, the blood phosphorus was unstable (though not classical of tetany), and a very prompt return to normal occurred after therapy was instituted with intramuscular injections of parathyroid extract, and with calcium lactate by mouth.

6. The clinical and laboratory signs of tetany appeared later than the mental state described as being preoperative.

7. It seems permissible, in this isolated instance, to consider these cataract changes as possibly connected with parathyroid deficiency and hence to be included in that rather indefinite class known as cataracts of tetany. One may think that other cases with lens changes from dinitrophenol poisoning may also belong to this category. There is no doubt that these lenses did not present the usual appearance of tetany cataracts, however.

8. It could not be satisfactorily determined whether the calcium ingested as calcium lactate was responsible for the rise in the blood calcium, or whether it came from the bone calcium, and how great a factor the few parathyroid injections used were in the rapid and remarkable improvement to complete and apparently permanent recovery.

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A PHYTOPHARMACOLOGICAL APPROACH TO SOME OPHTHALMOLOGICAL PROBLEMS

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A brief description is given of the phytopharmacological method and its use in the differential diagnosis of various blood diseases. This technique has been employed in testing sera obtained from patients suffering from various pathological eye conditions, particularly from pemphigus and trachoma. The phytopharmacological test is of interest not only from the standpoint of pathology and etiology but also as an aid in the differential diagnosis of doubtful cases.

The writer has been engaged for years in a comparative study of the effects of drugs and poisons on living animal and vegetable protoplasm. Such studies have led to the development of a department of science to which the name of *phytopharmacology* has been applied. It was found that living biological test objects from the plant kingdom are often much more sensitive to the effects of chemical agents than living zoological tests objects. This was particularly noticeable in connection with a study of various toxins generated by animals.[1] Blood sera from various pathological conditions, as compared with normal blood serum, produced no definite effect on surviving animal preparations but the author succeeded in demonstrating, by using delicate *plant-physiological test objects*, the presence of various toxic substances in human blood. Specifically, the effect of such toxins was studied on the growth, and so forth, of the roots of sensitive seedlings of *Lupinus albus* kept alive in physiological salt solutions. In this way it was established that there is in the blood of menstruating women a toxic substance named *menotoxin*.[2, 3] Similarly, by the use of phytopharmacological methods, it was first experimentally demonstrated that there is a toxin present in the blood of patients suffering with pernicious anemia.[4] This toxin was not present in other forms of anemia and so the test could be employed for differential diagnosis of primary anemia in doubtful cases and also as a criterion for the evaluation of the efficiency of therapeutic procedure.[5] Later work done by Macht and Pels has shown that there is another toxin of entirely different nature in the blood of patients affected with pemphigus[6], and the phytopharmacological method has now been established as a valuable aid in diagnosing this grave dermatosis.[7] The writer also discovered a toxin in the blood of leprosy patients.[8]

Inasmuch as pemphigus often develops first in the mucous membranes of the eye, the phytopharmacological method is of considerable interest to the clinical ophthalmologist. The following paper presents a comment on some of the practical applications of the author's phytopharmacological methods to the study of several ophthalmological conditions.

Method

A quantitative phytopharmaçological study of blood sera can be most satisfactorily made by using the living seedlings of the hardy plant, *Lupinus albus*, in accordance with the method which the writer has described at length in previous papers.[9] Some of the difficulties encountered in such experimentation have also been stressed in these publications.[10] The method of procedure may be briefly described as follows: Seeds of *Lupinus albus*, large variety, are allowed to stand and swell overnight in a beaker of tap water. The following morning they are planted in a specially prepared medium of finely divided sphagnum moss containing a suitable amount of moisture. The vessel containing the planted seeds is then placed in the dark at room temperature. Seedlings of a suitable length, with roots measuring from 30 to 45 mm., are usually ready for experimentation on the third or fourth day after the planting of the seeds. These are selected and carefully freed from adhering particles of sphagnum moss. The length of the roots is measured with a millimeter rule

and the seedlings are placed in an upright position in hard glass tubes containing the solutions to be studied. Ten or more seedlings, placed in tubes containing plant-physiological solution (Shive solution[11]), are used as controls. Other sets of seedlings, of as nearly as possible the same length as the controls, are placed in Shive solution containing 1 percent of normal or pathological blood serum. In this way any desired number of blood specimens may be studied. The length of the seedlings is carefully measured at the beginning and at the end of each experiment. After the first measurements have been taken, the whole set, containing the control seedlings and those in the various solutions to be tested, is placed in the dark, where these are incubated at a temperature of from 16° to 18°C. for 24 hours. At the end of that time the length of the controls and of the other seedlings is measured again. The increment in length of the roots of the seedlings in the solutions containing blood sera is divided by that of the seedlings in the control solution, and the result is designated as the *phytotoxic index*. Human blood usually gives an average phytotoxic index of from 70 to 75 percent.

The writer has had an opportunity to study by his phytopharmacological methods blood serum in three diseases of direct interest to the specialist in eye diseases; namely, from pemphigus cases, from patients with trachoma, and from a very rare disease known as Mooren's ulcer, of which only one case was available.

Pemphigus of the eye

Studies made by Macht and Pels have revealed that blood sera from patients with pemphigus give a characteristic phytotoxic index, the average in a large series of cases having been found to be 56 percent. The contents of the vesicles or bullae were also found to be toxic. Examination has been made of the sera in a number of pemphigus cases in which the primary lesions were either in the eye alone or in the eye and also in the skin. All these, tested on *Lupinus albus* seedlings, gave a characteristic phytotoxic reaction. Of course, the most interesting cases were those in which the early manifestations of the disease were confined to the eye. In such cases the phytopharmacological test was of great value in establishing a diagnosis and differentiating this disease from other conditions of less grave prognostic significance. A good example of such a case is furnished by the following history.

A female; aged 63 years; white, single, a nurse by profession, had had trichiasis of the right eye for four years and of the left eye for a year and a half. On December 21, 1934, the patient got a foreign body in the right eye, after which there was formed a corneal ulcer. She was treated intermittently thereafter. Meanwhile she had had a small ulcer in the left eye. She complained of photophobia, smarting, and a drying sensation in both eyes. Vision was blurred in both eyes.

When she was admitted to this hospital, March 19, 1935, the vision of the right eye was fingers at 2 ft., and that of the left eye fingers at 6 ft. Tension in both eyes was normal.

Examination, R.E.: The lids had rounded margins and there was trichiasis of both. The conjunctivae, both bulbar and tarsal, were very much injected, and there was some scarring of the upper tarsus. There were extensive bands of symblepharon. The cornea was hazy, showing extensive pannus formation covering nearly the whole cornea; and there were two small ulcerated areas in the lower half of the cornea. The iris was hazy and poorly seen and apparently bound down in several places to the lens. The lens and posterior segment of the eye could not be seen.

L.E.: Lids were similar to those of right eye with trichiasis of the upper lid and extensive symblepharon. Cornea showed pannus formation over the entire periphery. There was a small indurated area in the lower cornea that did not stain with fluorescein. The cornea was hazy throughout. The iris, lens, and posterior segment of the eye were apparently normal.

Lesions suspicously like those of pemphigus were found in the nose and throat. There was a coexistent atrophic rhinitis. The rest of the physical examination was essentially normal.

After she had been in the hospital some time there was a perforation of the cornea of the right eye and all hope of saving the eye was gone. Patient had considerable pain in both eyes.

A specimen of this patient's blood, sent to the writer for phytopharmacological examination, gave a markedly toxic reaction, the phytotoxic index being 57 percent. This diagnosis confirmed the

preliminary impression of the clinician and the later signs of the disease established the fact that it was pemphigus with primary ocular manifestations.

Trachoma

An ophthalmological condition in which a phytotoxic reaction is of considerable scientific and practical value is that to which the attention of the writer was first called by Professor L. A. Tscherkes, of the Nutrition Institute of Odessa. Tscherkes has used the writer's phytopharmacological method in studying sera from cases of pernicious anemia, pemphigus, and other pathological conditions and was the first to discover that a definitely toxic reaction is produced by sera from trachomatous patients. This finding prompted the writer to make a study of trachoma cases in the United States. Through the coöperation of public health officers in Oklahoma, Tennessee, Kentucky, and elsewhere, specimens of blood were obtained from 100 patients suffering with trachoma. The ages of these patients ranged from 6 to 69 years. These individuals, belonging to the white, brown, and red races, respectively, exhibited trachoma in all its stages, acute and chronic. It was found that the average phytotoxic index of the sera examined was 37.7 percent. Their toxicity varied from 25 to 62 percent. There was no particular relation between the degree of toxicity and the duration of the disease. The toxicity seemed to depend rather upon the acuteness or activity of the trachomatous process. Sera from patients in whom the disease had attained the cicatricial stage and displayed no activity gave the least toxic reaction. The control specimens were obtained from other forms of conjunctivitis. Sera in both acute and chronic cases of these various kinds of conjunctivitis gave the same readings as normal blood; namely, a phytotoxic index of from 70 to 75 percent. A few blood sera from glaucomatous patients also gave a normal phytotoxic reaction. A detailed description of these studies has been published elsewhere.[12]

These findings are of interest not only because they furnish another proof of the value of the phytopharmacological test in differential diagnosis but also because they throw some light on the pathology of trachoma. Although trachoma is a disease known to have existed for many centuries, its etiology is still uncertain. Some regard it as a purely local affection of the eye. Others consider it a systemic disease with specific ocular manifestations. An excellent résumé of the present status of our knowledge concerning the etiology of trachoma is given by Weiss.[13] The result of this phytopharmacological study lends support to the view that regards this disease as not a merely local affection but rather as a systemic disease or toxemia affecting the general metabolism of the patient and manifesting itself particularly through the lesions of the ocular apparatus. In its early stage, trachoma may be mistaken for pemphigus, the phytotoxic reaction being exhibited by blood sera in both diseases. However, the average phytotoxic index of trachoma sera is much lower than that of pemphigus sera. The two diseases can be easily differentiated from each other by the course of later clinical developments, such as the skin lesions of pemphigus and the more intense symptoms of trachoma. The following history, submitted to the writer by an ophthalmologist in Chicago, is an illustration of the difficulties encountered in differentiating between trachoma and pemphigus in their early stages.

> The patient was a female, 22 years of age, who lived near Joliet, Illinois, where there is quite a bit of trachoma. She was sent into the hospital as a trachomatous patient, but her clinical symptoms were not typical. Both eyes were characterized by a drying of the conjunctiva and massive symblephara which almost obliterated the lower culdesacs. On one eye there was a distinct pannus formation rising from the inferior margin of the cornea. She developed a corneal ulcer in one eye which perforated in spite of active treatment.
>
> There was no definite history of any skin lesions although she had suffered several years before from numerous lesions in her mouth. Her serology, blood count, and so forth, were perfectly normal.

At this stage of the disease, a specimen of the patient's blood was sent the

writer, who made a phytopharmacological examination and found that it gave a phytotoxic reading of 59 percent. This finding, reported to the ophthalmologist, elicited the following history:

> Her eye condition remained stationary while she was under our supervision. Suddenly she developed scattered vesicles and bullae over her body. These were very superficial and ephemeral. She was again examined by Dr. W——, who stated that these were typical pemphigus lesions. Shortly thereafter the patient left the hospital for treatment elsewhere.
>
> This patient's condition was interesting in that it presented a problem in differentiating pemphigus from trachoma. The findings in your test were thus substantiated about five weeks after the test was run.

Mooren's ulcer

The writer has recently had an opportunity to apply the phytopharmacological test to the blood obtained from a patient with another eye disease; namely, Mooren's ulcer, or rodent ulcer of the eye. This is an extremely rare pathological condition, the etiology of which is little known. Through the courtesy of Dr. Isadore Givner, of New York City, the writer recently obtained a specimen of such blood for phytopharmacological examination. Repeated tests with this specimen from the patient under Dr. Givner's care proved conclusively that this blood did not react either as did normal blood or blood from ordinary forms of conjunctivitis, acute or chronic. A definitely toxic reaction was given by the blood serum in this case, the average of the phytotoxic readings of several tests being 53 percent. Although only one case of this very rare disease has so far been available for pharmacological study, the writer reports this interesting finding in order to stimulate further investigation on the subject.

Summary

A brief description has been given of the phytopharmacological method employed by the author, and its usefulness in the differential diagnosis of certain ocular diseases has been demonstrated for the benefit of the clinical practitioner. This method has been shown to be of value not only in internal medicine but also in connection with certain diseases of the eye. More specifically, a definitely phytotoxic reaction has been discovered in cases of pemphigus of the eye and in cases of trachoma. These findings are of value in connection with differential diagnosis of the two diseases. They also throw some light on the pathology and etiology of these conditions in that they indicate that there is in such patients a systemic toxemia, the presence of which can be demonstrated by special phytopharmacological methods.

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POSTOPERATIVE ENDOGENOUS INFECTIONS OF THE EYE

Report of an unusual case

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The patient was a man of 78 years, in excellent general health. Operation for cataract included preliminary iridectomy and attempted extracapsular extraction. When the lens did not present the capsule was grasped with forceps and the lens gently torn away from adhesions, without loss of vitreous. The lower pole of the lens showed evidence of soft white exudate. Symptoms of infection on the second postoperative day led to treatment with foreign protein. A smear showed numerous extra- and intracellular diplococci, identified as gonococci. The patient recalled having had acute gonorrheal urethritis at 18 years of age, but no after effects. Urethral smears were negative for the organism, as was also a complement fixation test. The eye went on to phthisis bulbi. The other eye was not affected.

Postoperative infections of the eye may be divided into ectogenous and endogenous. According to Fuchs,[1] the interior of an eye is rarely infected until traumatism (operation) or ulcerative perforation enables the microörganisms to enter. According to him, endogenous infections are the result of embolism; that is, a septic substance from a septic focus getting into the circulation. Such an endogenous infection may be either purulent or nonpurulent. In the first case, infection is by the pyogenic germs—streptococcus, staphylococcus, or pneumococci, and others; in the second case, by the tubercle bacillus, the spirochete, or the gonococcus, germs which may set up a chronic, nonpurulent inflammation of the eye. In these infections, the parts of the eye most commonly involved are the iris and ciliary body. According to Selenkowsky,[2] quoted by Fuchs, endogenous infections frequently set up a chronic plastic inflammation instead of a severe suppurative infection.

Following a postoperative infection of the eye which is obviously not of exogenous origin, one is apt to be at a loss for an explanation if no visible focus is found. One is then apt to blame the intestinal tract, the genito-urinary system, or some other hidden focus of infection. It is not, however, commonly known that the eye itself may have been the source of this focus. In fact, the eye may have been the source of infection in spite of the presence of another visible focus. A study into the question of infection, in relation to our mechanisms of defense, will show how this is possible.

According to Billings,[3] "A focus of infection is a circumscribed area of tissue infected with pathologic microorganisms. Bacteria from such a focus may set up foci of infection elsewhere in the body." Kolmer[4] considers an infection to be present when microparasites have passed through the normal layers of the skin or mucous membranes and have proliferated into the deeper tissues. As soon as this occurs, our defensive mechanisms are set into action. This reaction depends on the type of infection. Following the brilliant researches of Metchnikoff, it is believed that for the great majority of infections, particularly for the germs we commonly come in contact with, phagocytosis, either by the wandering or fixed tissue cells, is our major weapon of defense. How phagocytosis works is still a question.

According to Rosenbach,[5] some organisms, after invading the tissues of the body, may become attenuated and live in the host for many years. This is particularly true of the tubercle bacillus, the spirochete, and the gonococcus. Internists have long recognized that the tubercle bacillus, which invades almost all of us during childhood, may remain dormant for many years, and then, as a result of favorable factors, become activated. Zinsser[6] believes such a reaction to be the result of a local balance that is struck between the bacteria and the tissues in which they lie; and that following a trauma or without any apparent cause, the germs become active. Not only can bacteria remain indefinitely in the tissues, but, according to Kolmer,[7] they may

even grow inside of the leucocytes and by them be transported into the deeper tissues. In fact, the leucocytes, by ingesting them, protect them from the antibodies in the blood. Rous and Jones[8] believe that as a result of entering into the fixed tissue cells, germs may be protected for an indefinite time from injury. It is on these facts that the importance of phagocytosis is being questioned.

It is also believed that germs, as living cells, are able to immunize themselves against the protective forces of the host. In this way Ehrlich explained the resistance of some spirochetes to continued arsenic therapy. It has, therefore, been shown that bacteria are able to live in tissue for an indefinite period of time, either within the tissue cells which protect them, or through a process of self-immunization or both. It has also been shown that from a focus of infection germs may enter directly into the blood stream and so be carried to other parts of the body, or they may be disseminated by the leucocytes or other phagocytic cells. This is particularly true for gonococcic infections.

According to Starer,[9] the gonococcus differs from other microörganisms in that it has the power of living symbiotically in human tissue and even inside of leucocytes from whose cytoplasm they may derive nourishment. As McDonagh[10] puts it, "When gonococci are seen inside the cells, the germs are living at the expense of the cells. The taking up of an intra-cellular habitat by microörganisms is the source of chronicity of many infections." Park and Williams[11] say that there is no time limit during which a man or woman may remain infected with gonococci. Fraser and Dye[12] have recently reported a case of acute exacerbation of a latent gonorrheal urethritis after 50 years, following a prostatectomy.

As we know, iritis is not an uncommon complication in gonorrhea. This type of iritis is interesting because, as Fuchs[13] has pointed out, it may heal leaving no synechia. In other cases the synechiae may be so peripherally placed that they cannot be seen by ordinary means of examination. Can we not imagine, in view of the evidence presented, that microörganisms can remain viable in a dormant state for many years around such adhesions, in fact long after the original focus has disappeared, and that, following a trauma or other favorable condition, the germs become active again?

Can we not also thus explain the many cases of unquestioned tuberculous infections of the eye, in which, even after a most diligent search, no other focus is found? Can we not assume that some germs entered the uveal tissue of the eye at a time when the original invasion was taking place, during childhood, and lay dormant until factors favoring their growth came along? In support of such a possibility, the author wishes to report the following case.

Case report: J. E. T., aged 78 years, a male, came to the office on April 10, 1931, with a history of progressive loss of vision for the past two years, greater in the left eye. He disclaimed having had any previous illness. Employed as a watchman in a large bank, a position he had been holding for the past 45 years, he had never been absent a day because of illness. His wife, past 70 years of age, was living and well. He had four children living and well.

Physical examination revealed a well-nourished man who did not look within 10 years of his age. He had advanced incipient cataractous changes in the right eye and a mature cataract in the left. Light perception and localization were good and he was referred to the Brooklyn Eye and Ear Hospital for a combined extraction of the left lens on May 3, 1931. At the hospital, examination of the urine showed numerous white blood cells but no bacteria. Conjunctival smear was negative. On May 4, 1931, following an O'Brien block of the N. VII and the usual preoperative toilet, a von Graefe incision was made. An iridectomy was performed and the capsule well opened with the cystitome. Attempted expression of the lens was unsuccessful. It seemed as if the lens were being held down at the lower pole. The incision was consequently enlarged with the

scissors, but still the lens could not be expressed. The capsule of the lens near the lower pole was then grasped with the capsule forceps and the lens gently torn away from the adhesions and slowly pulled out, without loss of vitreous. There was a small amount of soft whitish exudate on the lower pole of the lens. Atropine and merchurochrome were instilled and both eyes bandaged.

Inspection the next day revealed nothing abnormal, but on the following day, both lids were red and edematous. The lips of the wound were yellowish and there was pus in the anterior chamber. An injection of milk, 10 c.c., was given. The next day, the edema of the lids was worse, the conjunctiva very chemotic, and the eye was beginning to become proptosed. A smear showed the presence of numerous extra- and intracellular diplococci, which the pathologist diagnosed as gonococci.

On being questioned about such an infection, the patient finally recalled that when he was 18 years of age, 60 years before, he had had an acute gonorrheal urethritis for which he was treated. After that he had never had a urethral discharge or any other trouble and he had completely forgotten about it. He could not remember ever having had an iritis.

The edema of the lids and conjunctiva became progressively worse with the eye almost proptosed out of the socket. The anterior chamber was full of pus and finally even light perception was lost. Treatment consisted of injections of milk, 10 c.c., every other day and daily subconjunctival injections of oxycyanide of mercury. The smears repeatedly showed the presence of gonococci. At the request of the family, this was confirmed by a reputable private laboratory. Several urethral smears after prostatic massage were negative for gonococci. A complement-fixation test was negative but, as Kolmer[14] says, this does not exclude a gonococcic infection. According to him, gonococcus complement is produced in very small amount unless there is widespread gonorrheal metastasis.

After the eighth day, the edema of the lids and conjunctiva began to subside rapidly and the eye rapidly receded into the orbit. He was discharged on May 14, 1931, when the lids and conjunctivae were normal in appearance and several smears were negative. The eye continued to atrophy and when seen a year later there was an advanced grade of phthisis bulbi. The right eye was unaffected.

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NOTES, CASES, INSTRUMENTS

A SIX-METER RECORDING STEREOSCOPE*

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The importance of the time factor in the study of stereopsis was the principal reason for devising a six-meter recording stereoscope.

This stereoscope automatically controls the time factor. The speed of movement of one milk-glass plate can be changed by moving lever E, and the rapidity with which the test is made by adjusting lever F. A push button (A), attached to a six-meter cord (B), permits the instrument to be used at any desired distance. Milk-glass plates (C) are used instead of rods.

* Presented before the American Academy of Ophthalmology and Otolaryngology, September 17, 1935, Cincinnati, Ohio.

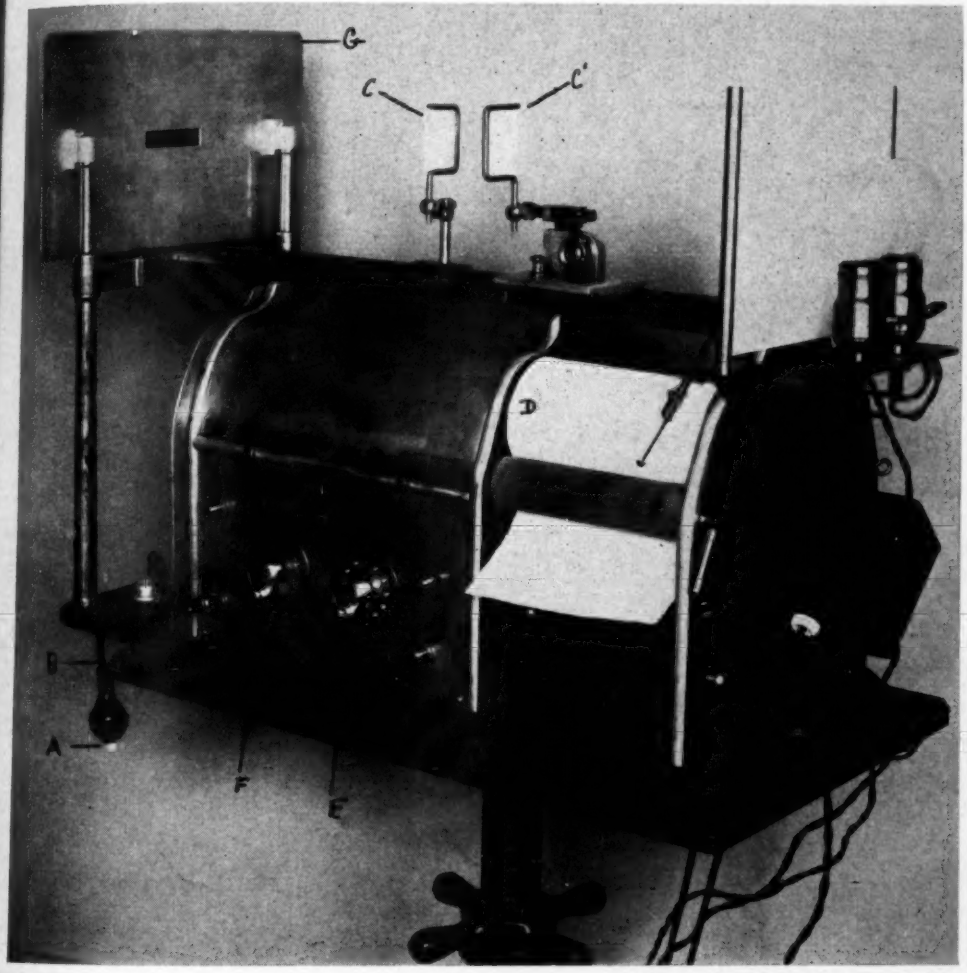

Fig. 1 (Berens). A six-meter recording stereoscope which automatically controls the time factor. *A*, push button. *B*, six meter cord. *C* and *C'*, milk-glass plates as test objects. *D*, continuous roll of paper for recording judgments. *E*, lever for regulating speed of carrier (*C*). *F*, lever for adjusting the length of the rest period. *G*, metal screen with slit through which milk-glass plates are viewed.

Records are made with a continuous roll of paper (D). The records of a subject who had excellent stereoscopic ability may be seen by referring to figure 2. The single horizontal line indicates the position of the stationary test object and shows the accuracy with which the subject made his judgments.

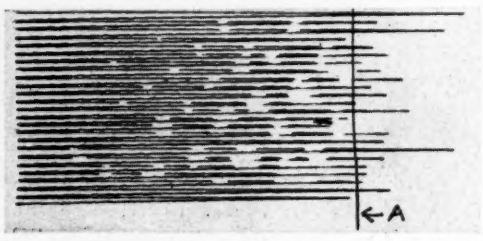

Fig. 2 (Berens). Record of stereopsis of a subject who had had excellent training in studying aerial maps with a stereoscope. Line A indicates the position of the stationary test object (milk-glass plate). Record made with the six-meter recording stereoscope.

This stationary rod may be moved and locked in a new position so that accuracy may be checked.

35 East Seventieth Street.

REPORT OF TWO CASES OF CATARACT FOLLOWING THE USE OF DINITROPHENOL

CLARENCE A. VEASEY, M.D.
SPOKANE, WASH.

Quite recently there have appeared in the literature reports of a number of cases of cataract that developed after the use of dinitrophenol. In the New England Journal of Medicine, October 31, 1935 (page 854), David G. Cogan and Frances C. Cogan have collected from the literature 20 such cases. All the cataracts seemed to have a characteristic morphology and a rapid rate of development. These authors were unable, however, to establish any definite causal connection as to the total dosage, the total time of taking the drug, the average rate of dosage, or the loss of weight. They state that "like other toxic manifestations of the drug, the development of cataracts shows a bizarre idiosyncrasy but unlike most other toxic reactions, cataracts develop from merely therapeutic doses. The pathogenesis of cataract formation may be similar to that of the allied drug, naphthol, but seems rather to be a result of tissue anoxemia with consequent damage to the lens epithelium."

The average age at occurrence was 37.9 years. The youngest was aged 25 and the oldest 50 years. All the cases with one exception occurred in women, which the authors state is undoubtedly due to the relatively larger consumption of dinitrophenol among women. Except in one case only, all the patients were using the dinitrophenol in the recommended therapeutic doses and the majority were taking it under the supervision of a physician. The average daily dose of all the patients in the series was .45 gram and, as they state, this is not a large dose when one considers the weight of most of the patients using the drug. It is understood further that three of the patients who developed cataracts took only a daily dose which at no time exceeded .3 gram. The total period during which the dinitrophenol was taken was stated definitely, according to them, in 16 of the 20 cases. It averaged 8.4 months.

In only three of the 20 cases collected were any other toxic manifestations given. One patient complained that she had slight gastrointestinal upsets when she took the drug, another that her feet and hands became numb, and a third patient had peripheral neuritis.

In their study of the cases reported, Cogan and Cogan could not give an accurate average of the time during which development of cataract throughout the group took place, but all of the patients showed the characteristic rapidity of development after the lenticular opacities were first observed. In one case vision declined from the beginning of observable dimness of vision to mere light perception in a single week. In five cases virtual blindness ensued within a month from the time that the first dimness was observed.

They describe the type of cataract in this series of cases as "cataracta complicata," and believe that the cataracts have a characteristic morphology and

that the type points to some exogenous etiology. In 10 of the reported cases there were sufficient descriptions to render the type recognizable. In the case of the other 10, however, it has been inferred that these were of the same type though accurate descriptions were lacking. The authors state that "the characteristics, par excellence, of cataracta complicata are the subcapsular position of the opacities and the initial involvement of the posterior cortex." This is aptly described as having a "brass filing" appearance.

The toxic effect of dinitrophenol on the lens apparently does not occur as an immediate reaction and may occur after the drug has been discontinued altogether. Four patients in the series developed cataracts about a year after the discontinuance of the drug, while two more developed them three or four months after it was discontinued.

The writer wishes to report the following two additional cases:

Case 1. Miss O. B., aged 46 years, presented herself first on September 19, 1935, with the statement that about six weeks previously her glasses had been changed by an optician, at which time he could see a few opacities which he thought were in the vitreous; they interfered but little with her vision. From that time until the date when I first examined her eyes her vision had been rapidly failing, although she had continued her work as assistant in a dental office until two weeks before coming to see me.

At this examination the vision for each eye was 1/135. Both pupils reacted normally to light and in convergence and accommodation. Both lenses were markedly cataractous, with soft flocculi interspersed throughout the cortical substance of each, and each flocculus looking not unlike a huge snowflake. The opacities had advanced to the stage that is seen in juvenile cataract a few days after needling. The flocculi were distinct, surrounded by clear cortex but each lens was so definitely opaque that no fundus reflex could be obtained. Light field and light projection were good.

The patient was placed in the hospital for observation for several days. The temperature remained normal. There were a few pus cells in the urine. The hemoglobin was 100, the red blood cells 4,380,000, white blood cells 10,600, polymorphonuclears 62 percent, lymphocytes 31 percent. The blood sugar was 118, and the blood Wassermann negative.

The patient being questioned as to whether or not she had been taking dinitrophenol, stated that from May 15, 1934, to October 20, 1934, she had taken dinitrophenol, administered by her physician, and subsequent to that time occasionally had been taking Re-Duc-Oid. Re-Duc-Oid contains no dinitrophenol. A letter from her physician stated that he had given her "graduated doses" between the dates just stated, the highest daily dosage having been 6 grains.

Here was a patient, therefore, who had taken dinitrophenol from small amounts up to 6 grains a day between May 15, 1934, and October 20, 1934, and whose vision did not begin to fail until about the first of September, 1935, 10 months after the last dose had been administered. Within six weeks from the first observation of failure of vision the lenses were quite opaque and swollen, the cortex being soft and filled with flocculi that probably earlier might have had the appearance of the "brass filings" so frequently described in these cases.

On October 19, 1935, a combined extraction of cataract in the right eye was performed. Two days later, at the first dressing, the anterior chamber was reformed, the pillars of the coloboma were free, and the wound well sealed. On the following day, three days after the operation, there was a very moderate chemosis of the bulbar conjunctiva, a few tiny spots of hemorrhage were seen on the capsule, and a little hemorrhage in the anterior chamber. On the following day the chemosis had increased, there was marked puffiness of the lids, the hemorrhage in the anterior chamber was more extensive, and the iris was seen with difficulty. The conjunctival wound was sealed but the corneal flap was slightly bulging and there was an extravasation of blood on the dressing. The patient had vomited

and there was very severe pain. This condition continued until October 29th, which was the first day that no fresh hemorrhage had been observed in the anterior chamber. At each dressing the dressings were stained from the hemorrhage from the bulbar conjunctiva. There was a clot beneath the conjunctival flap which fortunately at no time broke open. From this date (October 30, 1935), the chemosis became less and less, the hemorrhage in the anterior chamber was gradually absorbed, until on November 9th the eye was practically white, the anterior chamber clear of hemorrhage, the media clear, and the tension normal.

At this time it was ascertained that three days after the operation for cataract had been performed, the patient had begun to menstruate; that she was passing through the menopause and at times had considerable difficulty with menstruation, which was irregular; and that the chemotic conjunctiva with the extravasation of blood both from the conjunctiva and into the anterior chamber had continued until the cessation of menstruation, after which the ocular condition subsided within a few days.

On November 18, 1935, the patient was given glasses, obtaining vision of 6/9+.

Whether or not the dinitrophenol had anything whatever to do with the hemorrhagic condition described above or whether it was simply vicarious menstruation is not known.*

Case 2. Mrs. Blank, aged 45 years, had been examined last at this office on April 10, 1935, obtaining 6/5 vision in each eye with the following correction: O.D. +1.50 D. sph. ⌯ +.12 D. cyl. ax. 95°; O.S. +2.12 D. sph. ⌯ +.12 D. cyl. ax. 180°; with +1.00 D. sph. added for near. At this time, there were no pathologic ocular changes in the media or fundus of either eye.

The patient was next seen on November 30, 1935, when she stated that for the previous six weeks she had observed that her vision for both distance and near was rapidly becoming blurred. At this time the vision with glasses for O.D. was 6/9+, Jaeger 1 imperfectly at 14″, and with glasses for O.S. 6/12, Jaeger 8 imperfectly at 16″. The vision without glasses was O.D. 6/7.5 and O.S. 6/30.

In the right eye there were numerous lenticular opacities near the center of the lens and in the posterior cortex; at the periphery, just beneath the anterior capsule, were some tiny flocculi which with the slitlamp had the appearance of the so-called "brass filings" or huge snowflakes. There was also clear cortex in both of these areas. Throughout the left lens numerous small opacities were seen, more marked in the center and posteriorly; these also had the appearance of "brass filings" or huge snowflakes when viewed with the slitlamp.

The urine was negative for albumin, tube casts, and sugar. The blood sugar was 90 and the blood Wassermann negative.

It was ascertained that the patient had been taking dinitrophenol ten months previously, but the amount was not stated.

Here was another case in which dinitrophenol had been taken (the length of time and the amount unknown), and about nine months afterwards vision had begun to blur, progressing so rapidly that within six weeks' time one eye had advanced well toward cataract maturity. A month later it was operated on by a colleague.

1569 Paulsen Medical and Dental Building.

* Since this was written the other eye has been operated upon and has healed uneventfully.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

November 12, 1935

Dr. Phil M. Lewis, presiding

Gonorrheal ophthalmia

Dr. E. C. Ellett reported the case of Miss S., aged 20 years, who was struck in the right eye on the night of October 31st, by an egg thrown in a Halloween celebration. Five days later, on account of blood in the anterior chamber, pain, and high intraocular tension, a paracentesis was done under general anesthesia by an oculist in Little Rock. Since that time there had been no pain nor rise of tension. On November 8th, central corneal infiltration occurred, and she was brought to Memphis the night of November 10th. At that time, in the central half of the cornea, there was a large round yellowish area, apparently a sloughing, and at the upper edge of this was the incision for the paracentesis. The eye was red, the conjunctiva edematous, and there was some mucopurulent discharge. The vision was perception of light.

A smear made the morning of the eleventh showed gram-negative intracellular diplococci. Vaginal smears were negative. The area of corneal sloughing had exposed the iris and lens.

Secondary glaucoma

Dr. E. C. Ellett said that Dr. S., aged 79 years, had had good vision until 10 years ago when he began to develop myopia. When seen on November 11th, his vision was 10/200, and with —2.75 D. spheres before each eye about 20/60. He read J-6 without glasses. There was considerable nuclear opacity in both eyes, but the eyegrounds could be seen and showed some absorption of the retinal epithelium, vessels little if any altered, and the nerves were slightly yellow. There was no visible physiological cup and the lamina could not be seen. The fields were characteristically glaucomatous, but the tension was 12 and 16 mm. Hg. For comparison he showed the fields of three glaucomatous eyes each one of which presented all the signs of simple glaucoma and had been operated on.

Traumatic juvenile calcareous cataract

Dr. A. C. Lewis reported the case of L. K., a boy of 18 years, who consulted him about a blind right eye on October 11, 1935. There was no pain nor inflammation in this eye, but his good left eye became red and painful when reading.

Between two and three years ago, while twirling a piece of copper wire, the distal end struck him in the right eye. This was followed by much pain and temporary loss of vision. Under treatment the eye became quiet and vision fairly good in a few weeks. Soon, however, the sight began to fail again and six months after the injury there was loss of light perception. Examination showed a large scar extending across the cornea at the equator. The pupil was occluded by what appeared to be the old lens capsule, to which the iris was adherent at numerous points. Mydriatics caused no pupillary dilation.

On October 15th, after the synechia had been separated below with a knife needle, a medium-sized incision was made at the limbus above with the Graefe knife, the intention being to grasp the capsular membrane below, pull it out, and excise it with the adherent iris. This procedure was found impractical when a large hard mass instead of the suspected membrane was discovered. After the opening had been enlarged with scissors, the mass was grasped with capsule forceps and because it could not be detached from the iris, it was crushed with forceps and removed piecemeal. It proved to be a completely calcified lens of normal size. The cortex was about the thickness of

the shell of an ordinary hen's egg; it was hollow within, the nucleus having been absorbed.

On account of the manipulation required to remove the lens, the wound did not heal promptly, and there was considerable pain and inflammation in the eye for several weeks. On November 5th, three weeks after the extraction of the lens, the patient complained of photophobia in his left eye. To avert sympathetic ophthalmitis, the eye was enucleated and 20 grains of sodium salicylate given three times daily for several days. The left eye has now been relieved of symptoms and is apparently out of danger.

R. O. Rychener,
Secretary.

PITTSBURGH OPHTHALMOLOGICAL SOCIETY

November 25, 1935

Dr. Edward B. Heckel, president

Binasal hemianopsia

Dr. H. H. Turner presented a colored woman, aged 55 years, who, two years before, first noticed a bilateral veillike obscuration of vision which had been progressive and had had no treatment. The visual acuity was 20/100 in each eye and not improved by correction.

External examination was normal and tension normal. There was a definite atrophy of the temporal half of the discs with shallow cupping. Fields showed a complete binasal hemianopsia. Complement-fixation test was negative; roentgenograms were normal; B.M.R. was 15 percent; B.P. was 140/50. The neurological examination was negative. The patient's mental reactions seemed to be somewhat retarded.

Dr. Turner, in a discussion of this case, stated that the high pulse pressure might be a causative factor. The systolic impulse, being equivalent to a blow against the lateral aspect of the optic chiasm by the sudden expansion of the internal carotids, might be sufficient to produce the atrophy present. On mixed treatment, however, her vision improved to 20/40 in each eye but the fields remained the same.

Discussion. Dr. George Shuman expressed his belief that the basic cause was syphilis even in the presence of negative serology.

Trichinosis

Dr. Adolph Krebs reported a case of trichinosis in a 19-year-old white man. The patient stated that he had developed a cold on August 28, 1935, with pain over the maxillary and frontal regions and pain behind the eyes. He was treated for this cold by his family physician until September 9th, when he developed a discharge from each eye. Marked swelling of the upper lids developed and injection and edema of the entire ocular conjunctiva. The visual acuity was normal with correction. The media were clear. Fundus examination showed an edema of the upper nasal sector of the right optic disc and a patch of fluffy white exudate over the nasal margin of the left optic disc. The retinal veins were definitely enlarged but not tortuous. Nasal and X-ray study revealed cloudy ethmoid and maxillary sinuses and absence of frontal sinuses.

On the night of September 10th, his temperature was 106°F. following an intragluteal injection of milk, and on the following day he had not improved and was admitted to the Passavant Hospital for further study. After a blood count revealed 38 percent eosinophils, the following additional history was obtained: On August 24, 1935, he had eaten a cannibal sandwich. On August 26th, he developed pains and cramps in his abdomen followed by diarrhea. He took laxatives for three days but his abdomen remained sore until August 28th, when he began to have the symptoms previously mentioned. The infestation was undoubtedly due to some pork in the ground beef. With rest in bed and general treatment for his sinusitis he was able to leave the hospital four days after admission.

Dr. Krebs stated that in the more severe cases, in addition to the edema of the lids and conjunctiva and pain on

movement of the eyeballs, one might find subconjunctival and retinal hemorrhages, optic neuritis, and pupillary dilatation.

M. F. McCaslin,
Reporter.

CHICAGO OPHTHALMOLOGICAL SOCIETY

May 13, 1935

Dr. E. V. L. Brown, president

An unusual eye injury

Dr. W. A. Fisher said that this patient, a 34-year-old mechanic, was pounding on iron when a piece about 2 inches long struck him in the left eye. About one hour later, a small cut was seen in the lower lid and blood in the anterior chamber. Vision was 20/30. There was also blood in the vitreous, but the lens appeared to be uninjured. The presence of blood in the vitreous raised the question of a foreign body, although the injury was caused by a large piece of metal. A foreign body, 4 x 3 x 2⅛ mm. in size, was localized in the vitreous chamber by X rays.

It is well known that when a foreign body is removed from behind the ciliary body there often follows a detachment of the retina, or so much blood enters the vitreous that useful vision is lost or no vision at all is the final result. The usual approach recommended by Dr. Fisher has been through the cornea with a large pupil, at the same time removing the lens, even though uninjured, to avoid danger of detachment of the retina, and excessive, unabsorbable blood in the vitreous. In the present instance the procedure was as follows: the sclera was exposed and six short needles were used with a diathermy machine. An opening was made in the sclera far enough behind the ciliary body to avoid injury to the lens. The tip of a giant magnet was placed in the edge of the scleral wound and the foreign body removed. Three conjunctival sutures were inserted and tied.

Tapeto-retinal disease

Dr. Richard Gamble said that this 10-year-old girl came to the clinic at Children's Memorial Hospital on March 4, 1935. Three years ago it had been noticed that she held books too close to her eyes, and at that time she was fitted with glasses by an oculist, who one year later referred her to a consultant, whose diagnosis was retinitis pigmentosa. This diagnosis was also made later at the Illinois Eye and Ear Infirmary.

Wassermann and tuberculin tests were negative; the spinal fluid was negative. Lenses improved vision to O.D. 20/50, O.S. 20/100 but the vision was not constant.

There was no nystagmus and no history of night blindness. The optic discs showed a beginning waxy pallor. There was narrowing of the caliber of the retinal arteries and definite pigmentation in the right macula but very little pigmentation in the left. There were many areas of depigmentation and hyperpigmentation in the periphery of both the right and left fundus. The patient showed no evidence of cerebral degeneration or pituitary disturbance.

The fields showed only a slight bitemporal contraction, but must be interpreted with due regard to the rapid variations in visual acuity. For instance, on March 25th, the vision in each eye was 20/30, but failed rapidly in a few minutes to 20/100 in each eye. The patient was given ten drops of carotene in oil daily, beginning March 13th. On April 9th, right vision was 18/200, left vision 20/200; after keeping the eyes closed for 30 minutes, right vision was 20/20, left vision, 20/40, which again failed rapidly, probably due to rapid using up of visual purple. Several members of the family wore glasses, but apparently had no pigmentation disturbance. The child had had whooping cough, measles, chicken-pox, and mumps.

Accommodation and convergence

Dr. Ralph H. Woods read a paper on this subject.

Discussion. Dr. Thomas D. Allen said that the primary object in fitting glasses is not to make a person emmetropic, but to afford comfort or relieve as much discomfort as possible.

Glasses are not for the purpose of fulfilling a textbook description of what is normal. Inaccurate glasses are probably not so disadvantageous as some people believe or else department stores and jewelry stores would not have so much business as they have. However, accurate work is advantageous, and inaccuracy should not be condoned. Usually the class of patients found in private offices are appreciative of one-half, one-fourth, or one-eighth diopter in their glasses; they all appreciate a very slight change in the axis of the cylinder. The end point is not mathematical accuracy; comfort is the objective. Mathematical accuracy is one means to that objective. Cycloplegia is one means, very important, but by no means the only method, of arriving at that mathematical accuracy.

Dr. Allen agreed with Dr. Woods that there is a question as to the great value of duction tests. There is certainly value in measuring the near point of convergence, which is an objective test. With the rule on the bridge of the nose, and the zero opposite the plane of the glasses, a pencil point is brought toward the face and the patient instructed to watch it closely. The near point of convergence is the point at which one eye habitually diverges. Suppression is so frequent that it is impractical to take the patient's statement as to seeing the point double when one can observe whether the eye moves out. Also, the doubling might be due to poor accommodation. As suppression is so common, there is no particular point in stimulating simultaneous perception unless definite symptoms seem to be the result of suppression. Orthoptic training seems to be a good thing, but not a cure-all; if the patient is comfortable when suppressing, why interfere?

The preglaucomatous eye

Dr. Michael Goldenburg read a paper on this subject.

Discussion. Dr. I. R. Pritikin commented on temperature and barometric pressure, and their influence on glaucoma. Dr. Goldenburg had stated that a fall in temperature and a rise of barometric pressure are followed by a slight rise in tension in patients with glaucoma. If one took at that time a sample of blood, one would find a mild alkalosis, and the Brownian movement sluggish.

Dr. J. E. Lebensohn said that Dr. Goldenburg, in considering the etiology of essential glaucoma, stressed the quality of the aqueous, not the quantity of production and elimination. In all chronic congestive conditions of the eye, such as interstitial keratitis, atrophic ulcers of the cornea, chronic iritis, and so forth, there is generally a decreased tension of the eyeball. Not only that, but if one artificially produces an ulcer along the limbus, as Hamburger has done, there follows a decreased tension. In these situations with increased congestion of the iris there is increased permeability, just as much as could possibly occur under any condition, and yet instead of a rise in tension a fall results.

The lid-closure reflex of the pupil

Dr. Benjamin Boshes and Dr. Leo L. Mayer read a paper on this subject which has been published in this Journal (Nov., 1935).

Discussion. Dr. E. V. L. Brown asked if the reflex could be elicited when a lid speculum was used, if forcible contraction of the orbicularis could be brought about without narrowing the lid fissure.

Dr. Leo L. Mayer said that in patients who had no difficulty with the pupillary apparatus it could be demonstrated, although it was difficult where there was an ordinary light reflex. It was easily demonstrated in an Argyll Robertson pupil.

Robert von der Heydt

SAINT LOUIS OPHTHALMIC SOCIETY

May 3, 1935

Dr. Meyer Wiener, president

Ocular tuberculosis

Dr. William H. Luedde read a paper on this subject.

Malignant hypertension

Dr. F. E. Woodruff reported two cases of this condition seen recently in young men, 26 and 28 years old. In the first case arterial hypertension was known to have been present for over a year. In the second case there were eye symptoms and the patient died within six weeks. Both patients had advanced papilledema with systolic blood pressure over 200 and high diastolic pressure.

Discussion. Dr. Max Jacobs was glad to see men find cases of choked discs in malignant hypertension. He wanted to call attention to the fact that in eclampsia one found the development of a similar picture. He mentioned an eclamptic patient, brought in with convulsions, whose eye grounds at the time were normal. The patient recovered and several days later retinal exudates and hemorrhages appeared. Years ago the German investigators attributed the developments to vascular and renal diseases. As a result of the permeability of the vessels, the arterial blood supply to that part suffered interference. Was it not possible that a toxic process, somewhat akin to eclampsia, antedated the toxic process that preceded malignant hypertension?

Dr. H. Rommel Hildreth had seen both patients and said that one of them was of especial interest from the teaching standpoint. The patient in question when first seen had blurred vision, diplopia caused by a sixth-nerve paralysis of three days' standing, and bilateral choked discs. These findings made it necessary to rule out the question of brain tumor.

Dr. F. E. Woodruff in answer to Dr. Jacobs said that there was a difference between eclampsia and malignant hypertension in that most patients with eclampsia recovered.

Minimal visual requirements for safe automobile driving

Dr. Roy E. Mason read a paper on this subject which will be published in this Journal.

Discussion. Dr. R. E. Mason in replying to Dr. Meyer Wiener regarding the inability to read road signs when driving fast said that these signs were constructed by certain standards of measurements and colors with this fact in mind.

He agreed with Dr. Drewes that there were people who had special ability for special things. There were exceptions to all rules. Wiley Post flew safely around the world though he had only one eye.

With regard to illumination and light adaptation, as noted in youth and middle age, he replied to Dr. Hayward Post that this matter did not apply to his tests. The figures he quoted were from an engineering bulletin on vision and illumination.

In answering Dr. C. Tooker, he said he realized that a person with 20/200 vision created by temporary fogging with lenses was somewhat different from a man who normally had only 20/200 vision, but this difference was more in adaptation than in visual acuity. This fact was considered in arriving at his conclusions.

In reply to Dr. F. E. Woodruff about how many accidents were caused by poor vision he was unable to find any records. He believed eventually that after an accident there would be an investigation and an ocular examination would be required. This was done in some states now.

H. Rommel Hildreth,
Editor.

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WHICH FIRST, TEAR OR DETACHMENT?

The recent death of Richard Deutschmann, distinguished eye surgeon of Hamburg, Germany, recalls the old controversy as to the etiologic sequence of retinal detachment and retinal tear or hole.

Still active as a surgeon in spite of his eighty-three years, Deutschmann renewed the debate in a paper published the month before his demise (Zeitschrift für Augenheilkunde, 1935, volume 87, page 203). Though like Gonin a pupil of Leber, he failed to accept Gonin's dogmatic assertion that the tear always preceded the detachment.

We are reminded by Gilbert (Zeitschrift für Augenheilkunde, 1935, volume 88, page 74) that Deutschmann's "labors and services in the treatment of retinal detachment . . . secured for him for decades the reputation of one of the most sought after ophthalmologists of Europe." Deutschmann proposed and himself employed electrocauterization long before Gonin, although not with the idea of closing the retinal hole; but he found this procedure less successful than the transcision operation which he used for many years.

After Gonin's technique had been to some extent supplanted by diathermy and chemical methods, Deutschmann became an enthusiast for the use of cryotherapy (cauterization with carbon-dioxide snow), with which he claimed to have improved his earlier twenty-five or thirty percent of cures to between fifty and sixty percent.

The paper published shortly before his death cites a number of personal cases, and quotes from the experience of other authors, to support the old contention that the tear follows and does not precede the detachment. He attaches significance to the fact that,

just as retinal detachment begins almost always in the upper half, so the tears are nearly always found above or above and inward.

All observers have admitted that there are retinal detachments, some of them in myopic eyes, without tear, and that not every retinal hole is associated with detachment. Vogt and Safar are quoted as observing cases in which at first detachment definitely without tear was observed, and later the development of a hole where none had previously existed. Detachment may persist in spite of healing of the tear, and Deutschmann denies the accuracy of the now common judgment that closure of the hole or its delimitation from the surrounding retina leads to reattachment.

Deutschmann believed that the tear represented nature's effort to heal, and he cites cases reported by Safar and Gilbert as illustrating his further belief that detachments without spontaneous tear give the worse prognosis.

Rubbrecht, whose use of needle and thread for retinal fixation has been commented upon in the American Journal of Ophthalmology (1934, volume 17, page 68), argues that the essential factor in surgical treatment of retinal detachment is not closure of the tear, but the creation of artificial adhesions "at the place where the natural means of fixation are deficient" (Archives d'Ophtalmologie, 1935, volume 52, page 786). The deficient region, according to Rubbrecht, is that at which the detachment began. Sometimes the tear will furnish the best evidence as to the point of origin. Too often the case is seen too late for adequate information on this question to be obtainable, but some patients are able to indicate precisely in which part of the visual field the clouding of vision began, and this information is of value.

There may be some share of truth in each of the opinions here discussed, as well as in the further doctrine of Lindner that retinal detachment does not occur in the presence of a normal vitreous but is always related to the jarring produced by vitreous inertia during movements of the eyeball.

Some critics of Gonin have accused him of arriving at his therapeutic results, and also at his etiologic explanation, by purely empirical routes. But in the preface to his treatise on detachment of the retina, published in 1934, he declared that few lines of treatment in ophthalmology were so little entitled to be described as empirical; and he called attention to the researches which he had published in 1919 (Annales d'Oculistique) and 1930 (Société Française d'Ophtalmologie). He regretted that these researches had been ignored by most writers on the subject. He admitted that certain tears, notably those of atrophic origin and more exceptionally disinsertions, did not always or immediately lead to detachment; and he further admitted that retinal detachment without tear might be found in the form of an abrupt fold or of a more diffuse detachment with secondary choroidal exudation. He characterized as not far from the truth, but lacking in absolute truth, the aphorism of one of his pupils that "every retinal tear has its detachment and every detachment has its tear."

His frank judgment was that ophthalmologists who felt in a position to dispute the habitual presence of tears in idiopathic detachment gave proof simply that they had not searched with sufficient care and perseverance, or that they were ignorant of the great variety of form and size displayed by these lesions. He spoke of having encountered surgeons of great experience who, after declaring that they had never seen retinal tears, were much surprised at actual demonstration, sometimes in their own patients, for they "did not expect them to be so extensive, even to the point of involving one half of the retina, or on the contrary so minute as to be reduced to a simple fissure which one could take for a choroidal vessel, or to a small red spot resembling a hemorrhagic point."

Unfortunately, conclusive evidence on this problem does not seem obtainable by animal experimentation, and ultimate decision will probably have to rest upon the sum total of clinical experience.

W. H. Crisp.

MID-WINTER COURSE AND WESTERN OPHTHALMOLOGICAL SOCIETY

Six days with the clear skies and blooming flowers, roses and lilies, pansies and poinsettias, left a vivid impression of pleasant surroundings, instruction values, and inspiration associated with this opportunity for graduate education that has been developed for our profession at Los Angeles. Half of the time was devoted to otolaryngology, and these notes are for ophthalmologists. But no one who heard L. W. Dean, of St. Louis, and Isidore Friesner, of New York, state their conservative and balanced conclusions, drawn from long experience with diseases of the respiratory sinuses, or the mastoid and middle ear, could fail to profit by the lessons of general medical wisdom.

The leading guest instructor of the course was Col. Robert Emmett Wright, of Madras, India, who gave two months of his busy life to cross the ocean on his coming and return trip to share the lessons of his more than twenty thousand cataract extractions. When Wright, in 1937, reaches his time of retirement, he will have served as superintendent of the Government Hospital of Madras as long as both his predecessors, Major Kirkpatrick and Colonel Robert Elliot. In the presentation of every point brought out in his lectures, the hearer was impressed by the enormous extent of his experience, and the broad scientific information and philosophic thoroughness with which what he saw had been considered. His course might be regarded as an expansion and revision of the Montgomery Memorial Lecture, which he delivered before the Royal College of Surgeons in Ireland, in July, 1933 (Dublin Journal of Medical Science, Oct.-Nov., 1933). But every recent advance or suggestion with regard to the operation, the preparation, and the aftercare of each patient was considered with a statement of experience and judgment as to its value and importance. Each day, from one to three hours were occupied with Col. Wright's didactic lectures, illustrated with lantern slides and blackboard. The clinics he gave were full of suggestion and inspiration for all who could see them. All, who thus became acquainted with him, recognized a great teacher and a charming personality.

Colonel Wright deserved all the honor and appreciation he received but he was not alone in his teaching. Others were there who had worked in the great teaching centers of Europe, and in Boston, New York, Philadelphia, Baltimore, and San Francisco. Gray-haired specialists were kept busy, taking notes like students in a medical school. Almost two hundred were taking this course and, of these, over seventy had been present at one or more of the four mid-winter courses that have preceded it; fourteen had attended all of these courses. Most of these students came from the Pacific Coast region. But others were there from Honolulu, Canada, Pennsylvania, Massachusetts, Ohio, and Indiana, and more than half of the United States.

Saturday, January 25, was entirely given to otolaryngology in Los Angeles. But in Pasadena was held the third annual meeting of the Western Ophthalmological Society. This organization now has more than eighty members, and offered a bright, scientific, and attractive program. After brief remarks by the President, Dr. Hans Barkan, Col. R. E. Wright took up the subject of keratomalacia in India. This is the cause of more blindness in children than is ophthalmia neonatorum, or any other condition in India. It is unquestionably a deficiency disease; but it should not be ascribed entirely to lack of vitamin A, the so-called ophthalmic vitamin. It usually begins with night blindness which could be recognized in very young children. The corneal lesions may be chiefly epithelial, but generally produce opacities of the deeper tissue.

The origin of such words as ophthalmologist, optician, and optometrist from the original Greek and Latin terms, was treated by Dr. Frank Rodin, of San Francisco. Dr. David O. Harrington, of the same city, reported a case of removal of the temporal lobe with perimetric studies of the fields of vision, and a demonstration of the optic

radiations. Dr. C. Allen Dickey, of San Francisco, reported some unusual cases of squint, helped by orthoptic training. Dr. W. S. Franklin, of Santa Barbara, drew from his large experience some common-sense lessons of the management of patients and situations that arise in practice.

Dr. John E. Weeks read a paper on "The amblyopia of arsenical therapy," pointing out the dangers of idiosyncrasy and the special influences of arsenic on nervous tissue. Dr. Edwin M. Neher, of Salt Lake City described the origin of the brille in the rattlesnake. This is a transparent epithelial structure, covering the cornea and arising from the rudimentary lids. The snake has no movable lids to cover and protect the cornea. Dr. William Boyce of Los Angeles, presented "A motion picture study of the Elschnig technique" for cataract and other ophthalmic operations. Dr. Harold F. Whalman, of Los Angeles, read a paper reviewing the introduction of dinitrophenol as a stimulant of metabolism, and the reported cases of cataract, following its use. The discussion of this subject revealed the large number of cases of such cataracts occurring in some localities, and the extremely rapid progress of such lens opacities.

In the business session new members were elected, officers chosen for the ensuing year; and it was resolved that the annual meeting for 1937 should be held in Denver, in connection with the summer graduate course in ophthalmology.

Edward Jackson.

LICENSING OF OPTICIANS

Until recent years no effort had been made toward the licensing of opticians. Then nonmedical groups of those engaged in the refraction of the eye, who desired to increase the importance of this specialty and to protect the public and themselves from tests being made by unqualified individuals, organized and thereafter became instrumental in having laws enacted governing refraction of the eye in one state after another, until at the present time there is an optometric law in every state.

These laws, however, have failed to restrict the sale of lenses and other optical goods to those qualified to function in an intelligent and responsible manner. It seems obvious that not only should the public be protected from the inexpert refractionist but also from those who would sell inferior merchandise and those who cannot accurately fill prescriptions for ophthalmic lenses. It is true that most ophthalmologists make a practice of checking prescriptions after they are ordered; but owing to the complexities of modern lens grinding, it is not feasible for ophthalmologists to investigate in every case the details of the optician's work. It is not always easy to determine in a given case whether the best glass and the best method have been used in filling the prescription.

There seems to be a way to circumvent the intention of almost every law, good or bad. For example, at the present time, in some states in which there are rigid laws prohibiting the measuring of eyes for lenses by the untrained, the individual is allowed to test his own eyes for lenses at the counter of a department store! It might be possible to eliminate this kind of hazard, among others, by licensing those who dispense optical goods.

At the present time the writer knows of only one state in which there is a law for the licensing of opticians. There is a bill now under consideration by the Legislature of the State of New York which will provide such licensure in that State. By the provisions of this bill certain qualifications will be required of those applying for a certificate as an optician. They "shall have completed a course of study in a duly licensed school or department of a college or university authorized by the regents to give instruction qualifying a person to act as an optician in a course duly authorized by the said board of regents and the said course shall be for a period of not less than two years." In lieu of this, four years of apprenticeship to an optician following four years at high school may be accepted. The candidate would have to pass an examination given by the state board of

opticians. On this board would be one ophthalmologist. Exempted from the ruling would be ophthalmologists and optometrists, so that these would be permitted to dispense optical goods without an optician's license. At the outset, those who had been operating as opticians for five years, three of which were spent in New York State, would be licensed immediately.

This bill seemingly has the approval of most opticians. It is almost certain of the good will of ophthalmologists, for it is a protective measure which does not apply to them directly. Certain radical optometrists, those who desire to have refraction and all things pertaining thereto allocated to them alone, may oppose the measure; but if such opposition does develop, it would be by only a narrow-minded few.

Undoubtedly considerable harm is done by indiscriminate vending of cheap lenses. To license opticians and to prohibit others than those licensed from selling spectacles should in a large measure result in the elimination of this danger. We cannot but feel that such a law as the one proposed for the State of New York would be advantageous to the qualified dispenser of optical goods and to the public alike.

Lawrence T. Post.

BOOK NOTICES

Giza Memorial Ophthalmic Laboratory, Ninth annual report, 1934. Printed by Schindler's Press, Cairo, 1935. 150 pages, illustrated, price 25 P.T.

This report is similar to that of previous years, equalling in excellence its predecessors. There are four main sections: 1. Postgraduate education; 2. Pathological section; 3. Clinical section, and; 4. Research section.

Two courses for graduate students were given, one in April and one in October. Thirty-nine doctors attended the lectures. In the Pathological section it is noted that 571 specimens were submitted for examination; of this number 158 were excised globes. These figures are higher than they were in the previous year, a gradual increase from year to year. Interesting specimens are reported in detail, many with excellent photographs of fundus and external lesions and of sections. One notable case is that in which there was true bone formation in the tarsus in a specimen from an old trachoma.

In the Clinical division there are also many valuable case reports with some excellent colored illustrations. A case of crystalline degeneration of the upper half of the cornea is depicted. Perhaps the most arresting was that of a dome-shaped edema in front of the macula. Abnormalities in the patient were some dental pyorrhea and an apical abscess, slight haziness of one antrum, and ascaris ovis and amebic cysts in the feces.

The Research section includes a preliminary study of the ocular complications of the endemic diseases of Egypt. Further work has been done on the investigation of the etiology of trachoma. No drug used prophylactically prevented the development of the disease, though its appearance was delayed beyond the average by the use of "blue drops" (0.5 percent zinc sulphate with 0.01 per cent mercury pyoctannate).

A considerable number of journals are missing from the files of the Giza Hospital. These are listed in the Report. Any who have volumes that they would care to donate to the library can learn which ones are missing by consulting the Report or writing to Major Wilson, the Director of the Giza Memorial Ophthalmic Laboratory. Dr. Park Lewis of Buffalo has volunteered to see that the volumes are forwarded to Egypt.

Lawrence T. Post.

Social Security. By Edward H. Ochsner, B.S., M.D. Social Security Press, Chicago, Ill. 231 pages, price 40 cents. 1935.

This is a condensation from the author's larger books, "Social insurance and economic security," published one year ago.

We have abstracted several books on the general subject of medical economics during the past two or three years. Because of the uncertainties of eco-

nomics in general and the vital importance of this matter to all physicians it has seemed desirable to review in the Journal books on medical economics.

"Social security" is a vitriolic condemnation of socialistic tendencies in medicine. Unlike other books on the subject reviewed in these columns, there is no attempt to present the matter in an unprejudiced manner, stating both sides of the question from a somewhat detached point of view. In this book the author expresses a definite conviction that these socialistic tendencies are disadvantageous to the patient and to the doctor and should in no wise be permitted. He cites evidence indicating that state medicine, governmental medicine, and compulsory insurance in countries where they have been tried have proved anything but helpful. It is not a book of statistics but gives references where figures may be found.

The author deprecates the tendency toward distributing an increasing proportion of the fruits of labor of the industrial, frugal, and thrifty citizens to the lazy and shiftless, since this only encourages malingering and shirking.

To one interested in the discussion from the point of view outlined the book will be valuable. It is readable and contains much that is true. It presents strong appeal for a persistence of the old order.

Lawrence T. Post.

CORRESPONDENCE

Refraction in Europe and America

February 21, 1936.

Editor,
American Journal of Ophthalmology:

I have read with interest Dr. Crisp's editorial in the January issue of your Journal on "Refraction in Europe and America."

There is no doubt that there is a difference in attitude with regard to the prescription of glasses. I do not think that the lack of European refinement in refraction is the only or even the main cause for the divergent views.

It is true that the average ophthalmologist is better equipped in America than in Europe with all kinds of appliances for the precise measurement of anomalies of refraction. However, it cannot be denied that the scientific ophthalmologist in Europe is sufficiently versed in the art of prescribing glasses. After all, a retinoscope, a Javal, and a trial case in the hands of an experienced man are sufficient for good refraction. In my opinion, more important questions are involved: 1. The American ophthalmologist is more meticulous. While I worked in Europe, the trial case did not contain 0.12 D. sph. Lenses increased in power by 0.25 in the low grades. This fact in itself shows that 0.12 was not considered of practical value. Almost every eye has a slight astigmatism. The European ophthalmologist considered astigmatism below 0.50 as a physiological condition. Unless there were *special indications*, he did not prescribe glasses in most of such cases. There are cases of astigmatism, particularly of compound astigmatism, in which the patient cannot endure cylindrical lenses, and one is compelled to prescribe spheres. How many cases of hyperopia below 4.00 can be seen in which subjects who wore no glasses had no disturbances at all until they reached the presbyopic age! Even presbyopia in some of such cases begins late, at the age of 48-50. The muscle of accommodation in many cases can adapt itself perfectly well.

2. In prescribing glasses an individual approach is essential. In two similar cases of hyperopia below 4.00 I would prescribe glasses in a case in which a young patient has a weak muscular system, is anemic, cannot work without headaches or pain or blur, or has some constitutional trouble. And I think it proper not to use glasses in the second case in which a strong young person has no complaints whatever. I believe that standardization in medicine is a wrong thing. One should remember that *glasses are invented for people, not vice versa.* By the constant wearing of glasses a hyperopic subject who had not previously complained relaxes his muscles of accommodation to such an extent that he becomes handicapped in his work in case he breaks the glasses;

while without glasses he could go on perfectly well. In myopia below 4.00, which corresponds to a distance of 30-50 cm., the usual distance for close work, people are often better off without glasses for near work. Such a myopic subject, if he wears glasses constantly and feels tired during his work, would be able to continue his work without difficulty after removing the glasses; his muscles of accommodation would be relieved while the convergence would not be affected. Of course, if the muscles of accommodation are strong enough, and the patient does not complain of asthenopic symptoms, he can wear glasses steadily without any harm. However, it does not mean that in such cases the constant wearing of glasses is a necessity. Nothing will happen to the patient if in such cases he uses glasses for distance only. My European experience points to it definitely.

How many times have I ordered the discarding of glasses that have been worn for years! Cases in which —0.25 or even —0.12 are used for constant wear are not altogether rare. What is the sense of prescribing such glasses, unless one wants to produce a psychic effect on a neurotic?

3. An individual approach requires some medical knowledge for the proper evaluation of each case. Constitutional and local diseases must be taken into account. There exists in America an institute of optometrists which is not known in Continental Europe. Not very long ago the jeweler's store was the place for selling and prescribing glasses. Some of the former jewelers have become optometrists. The situation has improved since schools of optometry have developed. Still the graduates of such schools are not physicians, they lack the medical approach and must, therefore, tend to standardization. The public is urged over the radio and in other ways to go to optometrists, who do not produce "dead eyes" by instilling drops and who are best fitted to test refraction. The layman often does not know the difference between an optometrist and a physician: either is called doctor. Prescription of glasses in America has become to some extent commercialized.

Granted that the eyesight of the school children is taken care of better in America than in Europe, that the tempo of American life weighs heavily on the nervous system and produces more eyestrain, still thousands of people in America are wearing glasses unnecessarily.

I think that Dr. Crisp would admit that the topic discussed by him is more complicated than it may seem from his editorial.

Sincerely yours,
O. R. Lourie.

Viewing stereoscopic illustrations

January 9, 1936

Editor
American Journal of Ophthalmology:

I think any stereos printed in the American Journal of Ophthalmology should have a separation of 6 cm.—as they are usually made with a separation equaling the normal interpupillary distance, so as to give a definite projection, and a nearer separation would destroy the normal ratio between accommodation and convergence.

Why not give the Journal readers a simple cardboard septum (3 cm. in breadth) which makes fusion much more easy, and which hides the diplopic images—directions for use might be printed upon the cardboard.* If there is any difficulty in fusing with this method, as in the case of esophoric subjects, the page of the Journal can be bent so as to bring the two pictures nearer to one another.

Yours sincerely,
(Signed) Margaret Dobson.
140, Park Lane, W.I.
London.

ERRATUM

In the footnote of the paper on "Headache" by Dr. W. H. Crisp (1936, volume 19, number 2, page 96) the name of Dr. H. H. Vail should be substituted for that of Dr. Derrick T. Vail. The error originated in the editorial office.

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* Editor's note: Two fingers interposed between the pictures and the eyes and held on a level with the top of the stereos will serve as a septum.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, history
19. Anatomy, embryology, and comparative ophthalmology

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1. GENERAL METHODS OF DIAGNOSIS

Bedell, A. J. **Stereoscopic fundus photography: chairman's address.** Jour. Amer. Med. Assoc., 1935, v. 105, Nov. 9, p. 1502.

Cases reported and illustrated by photographs include choroideremia, high myopia, angioid streaks, allergic fundus reactions, papilledema, and detachment of the retina. (6 photographs.) George H. Stine.

Borsotti, Ipollito. **A Contribution to the study of the reticulo-endothelial system of the eye by means of the technique of vital staining.** Ann. di Ottal., 1935, vol. 63, Nov., p. 829.

The reticulo-endothelial system has been of great interest to opthalmologists as well as to general anatomists since its discovery by Goldmann. By preliminary injection of a solution of dionin in the conjunctival sac, the author obtains vital staining of the reticulo-endothelium of the anterior segment of the eye much more quickly than has been possible by simple injection of the staining material into the circulation. The stains used were lithio-carmine and thoriophanine. The author has even demonstrated the existence of reticulo-endothelial elements in the cornea.

Park Lewis.

Damel, C. S. **Some comments on the green color observed in autochrome fundus photographs.** Arch. de Oft. de Buenos Aires, 1935, v. 10, Aug., p. 601.

In the atlases of Oeller, Haab, Adam, and Wilmer and in a fundus drawing by Lagleyze one encounters a greenish tint in the fundi which is only occasionally referred to in the text. Lijo Pavia first observed it in his autochrome photos and thought it due to reflection by the internal limiting membrane. Later Lijo Pavia came to identify the appearance with states of edema of retina or choroid. If however, one compares photographs of the same fundus in black and white with those in color, one can see that whatever appears white in the former has a definite greenish tint in the latter. Experimental lesions on the other hand are recorded as green by the autochrome plate without showing any edema in sections. The green color of the autochrome plate is to be regarded as an optic phenomenon of interference resulting from the source of light, its intensity, and its passage through the eye and the camera. In the opinion of the writer it has no clinical significance.

M. Davidson.

Gertz, Hans. **Theories of ophthalmoscopic illumination.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 46.

A discussion of ophthalmoscopy with the plane and the concave mirror.

Ray K. Daily.

Jackson, E. **Subjective studies of the blind spot and visual fields.** Amer. Jour. Ophth., 1936, v. 19, Jan., pp. 34-36; also Trans. Amer. Ophth. Soc., 1935, v. 33, p. 76.

Lebensohn, J. E. **Scientific and practical considerations involved in the near-vision test with presentation of a practical and informative near-vision chart.** Amer. Jour. Ophth., 1936, v. 19, Feb., pp. 110-117.

Lijo Pavia, J. **Concerning Damel's comments (see above) on the green color observed in autochrome fundus photographs.** Rev. Oto-Neuro-Oft., 1935, v. 10, Nov., p. 312.

Lijo Pavia distinguishes three categories of green coloration: the artificial one, which cannot be demonstrated ophthalmoscopically; lesions which have a greenish color both ophthalmoscopically and in the autochrome plate and are confirmed by Niemayer, who made a drawing of one fundus as he saw it ophthalmoscopically; and the typical "green patch" in a normal or abnormal eye, also seen both ophthalmoscopically and in the autochrome plate, and constituting an entity. Lijo Pavia believes it represents a state of edema. Whether it has clinical significance or not, it ought to be looked for, and when found justifies further clinical study of the patient.

M. Davidson.

Mossa, G. **Experimental researches on the Sanarelli-Schwartzmann phenomenon in lids, bulbar conjunctiva, cornea, iris and ciliary body.** Boll. d'Ocul., 1935, v. 14, July, pp. 1031-1049.

In order to provoke the necrotic-hemorrhagic phenomenon of Sanarelli and Schwartzmann in eye structures the writer injected in rabbits a filtrate of typhoid bacillus subconjunctivally and twenty-four hours later intravenously. The changes took place in lids, conjunctiva, iris, and ciliary body. The writer hints at the possibility that the phenomenon might have value in determining the pathogenesis of some ocular changes of obscure etiology such as hemorrhages of deep membranes, vitreous and others. These changes might depend upon tissues affected by preceding sensitization reacting to toxic substances in the blood stream. (Bibliography, 4 figures.)

M. Lombardo.

Murphy, F. G. **Remote point for visual-acuity tests.** Amer. Jour. Ophth., 1936, v. 19, Feb., pp. 151-152.

Panico, Emanuele. **Biomicroscopic aspect of ocular recti muscles.** Boll. d'Ocul., 1935, v. 14, Sept., pp. 1241-1244.

In elderly persons, biomicroscopic examination will demonstrate the tendinous fibers of the external rectus and sometimes those of the internus. They have a pearly aspect, resembling bundles of silk filaments. (2 color figures.)

M. Lombardo.

Rosengren, Bengt. **A slitlamp of simplified construction.** Acta Ophth., 1934, v. 12, pt. 4, p. 375.

This hand slitlamp contains a 6 to 8-volt 5-watt lamp as a source of light, a condenser system placed close to the light, and a 32-diopter object lens, adjustable in position. A May opthalmoscope head may be attached to the apparatus, which is thus converted into a strongly illuminated ophthalmoscope. (Illustration.) Ray K. Daily.

Sciortino, S. E. **A new method of pharmacodynamic exploration and its semeiologic value in nervous and physiologic anisocorias.** Boll. d'Ocul., 1935, v. 14, July, pp. 960-983.

This method for examination of the pupils consists in stimulating the terminations of the pupillomotor paths with minimal drug stimuli. Cocain and adrenalin were used to stimulate iridodilation and pilocarpin or eserin for iridoconstriction. The method was found useful in evaluation of obscure conditions. Clinical cases are reported. (Bibliography.) M. Lombardo.

Vianna, A. M. **Self-examination of the ocular fundus.** Ann. d'Ocul., 1935, v. 172, Nov., pp. 936-942.

The author describes a technique by which it is possible to examine the fundus of one's own eye. Standing before a vertical plane mirror, and holding an ophthalmoscope before one eye, one examines the fundus of the other eye (as seen in the mirror) by indirect ophthalmoscopy, using another mirror or, better, a prism to divert the image.
John C. Long.

2. THERAPEUTICS AND OPERATIONS

Anastasi, Licio. **The anesthetic power of cocaine hydrochloride in relation to hydrogen-ion concentration of the solution.** Boll. d'Ocul., 1935, v. 14, Nov., pp. 1519-1536.

In rabbit and man, the anesthetic power of the solutions decreased in inverse proportion to the p_H value. (Bibliography.) M. Lombardo.

Berens, Conrad. **A combination loupe and head mirror.** Amer. Jour. Ophth., 1936, v. 19, Feb., p. 152.

Cori, Renzo de'. **Experimental and clinical researches on the action of lipolytic enzymes on ocular tuberculosis.** Boll. d'Ocul., 1935, v. 14, Aug., pp. 1142-1189.

On the basis of experimental research in 24 rabbits the writer concludes that experimental primary tuberculosis has a more benign course in animals previously treated with the esterase of tuberculous swine than in control animals. In six patients affected by iridocyclitis with positive skin reaction the local and general conditions improved or were cured. The esterase dissolves the fatty elements of the tubercle bacillus, whose proteins are dissolved, possibly by proteolytic enzymes. (Bibliography, 13 figures.)
M. Lombardo.

Decker, J. F. de and Arendt, J. **The effect of ultrashort waves on diseases of the human eye.** Klin. M. f. Augenh., 1935, v. 95, Oct., p. 462. (Ill.)

Daily radiations of ten minutes, or in obstinate cases fifteen minutes, with the tube transmitter of Siemens were applied in cases of herpetic, vesicular and parenchymatous keratitis, of scleritis, and of severe conjunctivitis, described in eight clinical histories. This treatment is indicated in all diseases in which heat is generally applied, and it is superior to the usual methods, especially in herpetic affections. It has an absorbing effect in older corneal opacities. No unfavorable action was observed except in cerebral arteriosclerosis, which may be considered as a contraindication. C. Zimmermann.

Dulewiczowa, Marja. **The effect of hot and cold ocular applications on systemic blood pressure.** Klinika Oczna, 1935, v. 13, pt. 4, p. 714.

To explain the disagreeable general reactions sometimes met with after hot or cold applications to the eye, the author studied the effect of diathermy, thermophore, and ice application to the eye on the general blood pressure. The charted reports of the study show that these thermal ocular applications do not cause significant variations in blood pressure and have no effect on the ocular tension. Ray K. Daily.

Falcao, Theophilo. **Ocular tuberculosis and tuberculin.** Rev. de Ophth. de São Paulo, 1935, v. 4, Oct., pp. 177-188.

The subject is discussed upon the basis of a questionnaire, and without original investigation.

Kraupa, Ernst. **Lastex bandage for the eyes.** Zeit. f. Augenh., 1935, v. 88, Dec., p. 29.

As superior to the pasteboard eyeshields commonly used by the patient himself, Kraupa recommends a roller bandage, 6 by 40 cm., of an elastic woven material such as is used for elastic stockings. F. Herbert Haessler.

Simon, Italo. **Rapidity of absorption of drugs from the conjunctival sac.** Rassegna Ital. d'Ottal, 1935, v. 4, July-Aug., p. 565.

The article is a continuation of the dispute between the author and Gal-

lenga (see Amer. Jour. Ophth., 1935, volume 18, page 1168) concerning the work indicated by the title.

Eugene M. Blake.

Zappalà, Antonino. **Antivirus therapy in ophthalmology.** Rassegna Ital. d'Ottal., 1935, v. 4, July-Aug., p. 550.

The author has found an Italian proprietary ointment almost miraculous in treating external diseases of the eye. The ointment is described as containing a stock polyvalent antivirus prepared from the germs most commonly found in ocular diseases. Conditions which responded readily to this antivirus were: infections of the lids, corneal ulcerations (especially trachomatous), phlyctenules, and, above all, corneal and scleral wounds (as to prevention of infection).

Eugene M. Blake.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Alaerts. **Three cases of inverse stereoscopic vision. Pseudoscopic relief.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 33.

Out of nearly 5,000 school children examined by the writer, three presented this rare condition. There was no refractive error and no strabismus and coöperation was good. In looking at stereoscopic photographs one child reformed or straightened the images mentally, but two stated that the image remained abnormal (the objects of the first plane were elongated inversely), and that "they preferred to look without the stereoscope." In seeking a possible cause it was noted that in all three children the distance between macula and optic disc differed in the two eyes. In one case the separation was two disc diameters in the left eye and four and one half in the right. This offers an explanation based on the theory of preponderance of peripheral retinal points. The two retinas are not superimposable. The macula is not always situated at the intersection of the two hemiretinas, and such an anomaly explains the false retinal impression of a lengthened or shortened image.

Jerome B. Thomas.

Biffis, A., and Mayer, M. **Researches on the mobility of the lens during accommodation.** Boll. d'Ocul., 1935, v. 14, July, pp. 1012-1030.

The authors describe an apparatus by which the distance from the near point to the corneal vertex is determined in the upward and downward positions of the head. In tabulated form this distance is given in cm. and the displacement of the lens in these positions is expressed in millimeters. The authors conclude that during the act of accommodation there is a relaxation of the zonula which allows the lens to be displaced according to its gravity. (Bibliography.) M. Lombardo.

Bishop, G. H. **Electrical responses accompanying activity of the optic pathway.** Arch. of Ophth., 1935, v. 14, Dec., pp. 992-1019.

This paper reviews the more recent information on the activity of the various elements involved in stimulation of the retina by light and its transmission to the cortex, and on the modifications that take place in the character of this impulse as it passes over the different neural elements lying between these points. J. Hewitt Judd.

Castrignani, G. **Clinical contribution to refractive changes in diabetes.** Ann. di Ottal., 1935, v. 63, Nov., p. 869.

The author gives a typical case of the development of myopia in a diabetic subject, with rapid restoration of sight under insulin. He reviews the various theories to explain the pathogenesis involved. (Bibliography.) Park Lewis.

Cori, Renzo de'. **Some useful observations in the correction of ametropias.** Boll. d'Ocul., 1935, v. 14, Sept., pp. 1234-1240.

The author discusses the finding of the astigmatic axis, and other details. (Bibliography.) M. Lombardo.

Crisp, W. H. **Headache.** Amer. Jour. Ophth., 1936, v. 19, Feb., pp. 93-100.

Csapody, I. **Remarks on Sattler's article "Experiences with contact glasses"** (see Amer. Jour. Ophth., 1935, v.

18, Dec., p. 1161). Klin. M. f. Augenh., 1935, v. 95, Oct., p. 524.

Csapody calls attention to the fact that he first proposed making a mold of the eyeball as the basis for ordering contact glasses. C. Zimmermann.

Fischer, F. P., and Jongbloed, J. **Investigations concerning dark adaptation in diminished oxygen pressure of respiratory air.** Arch. f. Augenh., 1935, v. 109, Dec., p. 452.

The examination was conducted in a caisson, where the air-pressure corresponded to an altitude of 3,000 and 6,000 meters. Dark adaptation was found very greatly retarded. The retardation is the physiologic expression of impeded resynthesis of the light-sensitive substance of the retina, proving that oxygen is necessary for such resynthesis. G. Grunfeld.

Focosi, Marcello. **The correction for near in myopia.** Boll. d'Ocul., 1935, v. 14, Oct., pp. 1363-1383.

The writer has calculated mathematically and shows in tabular form the values of correcting glasses for near vision according to the different degrees of myopia and the different values of visual acuity.
M. Lombardo.

Fry, G. A. **The relation of accommodation to the suppression of vision in one eye.** Amer. Jour. Ophth., 1936, v. 19, Feb., pp. 135-138.

Fuchs, A. **Bilateral paresis of accommodation in children.** Wiener klin. Woch., 1935, v. 48, Dec. 13, pp. 1547-1548.

Four cases of isolated bilateral paresis of accommodation were encountered within four weeks in children, all in excellent general health and without neurologic pathology. There was no history of preceding illness. Thus the author believes one must search for a hitherto unknown etiology. Bertha A. Klien.

Goebel, O. **Visual perception.** Graefe's Arch., 1935, v. 134, p. 341.

The author considers the outer members of the cones as resonators for definite kinds of light vibrations. At the boundary between the outer and inner members of the rods and cones, he assumes partial reflection. The longer the stretch of the outer members of the cones traversed by the light, the more electrons are brought into vibration. In favorable circumstances, in the outer members of the cones occur strongly active light vibrations which resemble phosphorescence in persisting after the light stimulus has ceased. Thus is explained the occurrence of white and colored positive after-images. The author argues that the outer members of the cones exist to increase the strength of the light, while the inner members of the cones are the apparatus for adapting the eye to the strength of the light. Adaptation of the eye to light occurs in a few seconds, progressive adaptation to darkness only after a longer period. Shortening of the inner members of the cones through contraction of the myoids therefore takes place quickly; complete lengthening or restoration occurs slowly. H. D. Lamb.

Grandi, G. **Clinical statistic considerations on strabismic amblyopia.** Boll. d'Ocul., 1935, v. 14, Nov., pp. 1479-1518.

Amblyopia is absent or less marked in alternating and periodic strabismus, either convergent or divergent, while it is always present in permanent strabismus, is more marked in convergence than in divergence, and is more marked the older the deviation. With the exception of 2.5 percent of emmetropic cases a defect of refraction is always found. The amblyopia establishes itself from non-use of the eye and in the presence of a defect of refraction. (Bibliography.) M. Lombardo.

Hoff, H., and Pötze, O. **A subjective disturbance in color perception accompanying supratentorial tumors.** Med. Klin., 1935, Nov. 15, pp. 1501-1504, and Nov. 22, pp. 1540-1542.

In several cases of supratentorial tumors without other ophthalmic lesions the authors found very subtle disturbances in color perception, in the form of hemianopic quantitative altera-

tion of color perception, described by the patients as loss of brilliancy. These tumors were found to press upon the basal temporo-occipital regions.

Bertha A. Klien.

Holm, Ejler. **Rapid decrease in hyperopia.** Det oft. Selskab i Köbenhavn's Forhandlinger, 1934-1935, pp. 18-19. In Hospitalstidende, 1935, Dec. 17.

A boy aged two years with convergent strabismus showed a hyperopia of 10 D. in each eye. The refractive error was corrected fully and tenotomy of one internal rectus gave orthophoria. At twelve years the hyperopia was still 9 D. but from this time there was a rapid decline in the hyperopia, most rapid around the age of fourteen years, and at eighteen years having fallen to 5 D. in each eye. There was no corneal conus nor any other abnormal change in the eyes. D. L. Tilderquist.

Jackson, Edward. **The control of myopia.** Jour. Amer. Med. Assoc., 1935, v. 105, Nov. 2, p. 1412.

Jackson restates his earlier views that the progressive changes in myopia are produced directly by excessive and too long continued convergence. Other theoretic explanations can be set aside until excessive convergence has been eliminated by constant use of full correcting lenses and attention to posture. The early detection and correction of beginning low myopia is one of the most important applications of school hygiene. These conclusions are derived both from the extended clinical experience of other observers and from the findings in 381 personal cases of myopia determined with cycloplegia and followed through periods of from two to 39 years. Under ten years of age the tendency toward myopia is general, and in most myopic eyes the defect is increasing. After the age of twenty this tendency disappears and the majority of myopic eyes show little or no increase. After the age of fifty years there is a tendency to decrease of myopia. (One table, discussion.)

George H. Stine.

Levinsohn, G. **The genesis of myopia.** Acta Ophth., 1934, v. 12, pt. 4, p. 362.

This report of experimental and histologic studies on apes supports the author's contention that the development of myopia is caused by forward inclination of the body and head in reading. Ray K. Daily.

Parsons, John. **The electrical response of the eye to light.** Brit. Jour. Ophth., 1936, v. 20, Jan., p. 1.

This contribution is a résumé of the work of many experimenters. With many graphs and a long bibliography, the author presents observations of research into the electrical response of nerve tissue to light. Subheadings include adaptation, wave length, optic nerve response, analysis of electroretinograms, and intermittent light.

D. F. Harbridge.

Roelofs, C. O. **Optic localization.** Arch. f. Augenh., 1935, v. 109, Dec., p. 395.

Optic localization of the fixation point is determined by the motor impulse which the fixation point itself elicits, and is independent of the position of the eye and of the general innervation of gaze which exist during fixation. R. Grunfeld.

Tschermak-Seysenegg, Armin. **New color-sense tests. A suggestion to supplement pseudoisochromatic plates.** Arch. f. Augenh., 1935, v. 109, Dec., p. 457.

For detection of red-green blindness the author suggests the following method. Sectors of a ring are made of various hues and saturations of yellow, blue, and gray. In the central space, color discs from a color series are placed for matching. If the color of the disc matches a hue in the ring sector it will seem to the observer to unite to form a keyhole figure. The red-green blind will match all grades of various colors lying between red and green with a saturation and hue of a pure yellow or blue color; or a certain red or green color with a certain grey color.

R. Grunfeld.

Warburton, F. L. **Recurrent vision with a moving stimulus of alternating intensity.** Brit. Jour. Ophth., 1935, v. 19, Dec., p. 672.

Such a stimulus was attained with a rotating disc having radial slots. Revolving the disc at slow speed a broad bright band was observed. Increasing the speed the moving band widened out until it filled nearly the whole circle. The conclusions from the experiments support the theory that these phenomena are largely due to the temporal course of the sensation produced by a stimulus of short duration, although spatial induction may inhibit some part of the course of sensation.

D. F. Harbridge.

4. OCULAR MOVEMENTS

Abraham, S. V. **The nonsurgical treatment of nonparalytic strabismus.** Amer. Jour. Ophth., 1936, v. 19, Feb., pp. 139-145.

Berens, Conrad. **Forceps for use in surgical operations on the ocular muscles.** Arch. of Ophth., 1935, v. 14, Dec., pp. 990-991.

The forceps is so constructed that an elevated ridge on one jaw fits into a depression on the other, thus eliminating the teeth and pins. A 10-mm. rule is attached to the shaft and the forceps are fitted with a sliding catch. Four evenly spaced depressions in each jaw form holes which permit the passage of needles when the forceps is closed. Their position is indicated by vertical lines on the jaws. J. Hewitt Judd.

Berens, Conrad. **Red multiple Maddox rod with a prism.** Brit. Jour. Ophth., 1935, v. 19, Dec., p. 661.

This rod has a 0.75 diopter prism with its base at a right angle to the rod image. In examining a subject with no vertical imbalance, quickly rotating the prism will cause the line to appear alternately above and below the light at equal distances. If the red streak of light is seen exactly through the light the patient has hyperphoria.

D. F. Harbridge.

Fink, W. H., and Bryngelson, B. **Relation of strabismus to right or left-sidedness.** Arch. of Ophth., 1935, v. 14, Dec., pp. 947-956. (See Amer. Jour. Ophth., 1935, v. 18, Aug., p. 780.)

Fledelius, Mogens. **Ocular paralysis as a complication of infectious mononucleosis.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 150.

This is the first reported case of muscle paresis in the course of a monocytic angina, probably secondary to an encephalitic process. The patient was 21 years old, and the muscle affected was the left inferior rectus.

Ray K. Daily.

Grimm, R. **Convergence and determination of distance.** Graefe's Arch., 1935, v. 134, p. 359.

The smallest amount of movement of the muscles of convergence is measured through the smallest angle of rotation of the eye produced by voluntary convergence. In determining the depth intervals traversed by the eyeball when the eye is rotated, the author uses six minutes as the minimal angle of rotation that can be measured. The distances of the objects converged upon from 180 cm. at intervals of 10 cm. down to 20 cm. are tabulated, together with the corresponding depth intervals in centimeters traversed by the eyeball. The length of the base line of the eye is 6 cm. H. D. Lamb.

Hubert, J., and Lebas, J. **Surgical treatment of concomitant strabismus with the myocampter.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 36.

The myocampter of Barraquer, employed in advancement, effects muscle shortening by a subconjunctival capsulomuscular fold. The authors claim to have improved the instrument by elongating its branches, and they free the muscle before shortening.

Jerome B. Thomas.

Marquez, M. **A new diagram of the action of the ocular muscles.** Rev. gén. d'Opht., 1935, v. 46, Sept., pp. 275-282.

The author has modified his original diagram by using oblique arrows to

indicate the resultants of the horizontal and vertical tractions exerted by the two obliques and the superior and inferior recti. (5 illustrations.)

W. H. Crisp.

O'Connor, Roderic. **Surgical correction of pure convergence insufficiency.** Arch. of Ophth., 1935, v. 14, Dec., pp. 986-989.

The author advocates the use of his cinch-shortening operation as giving a positive and accurately graduated correction of this condition. He reports only two cases in which a permanent disabling esophoria resulted. Both were corrected by a similar operation on the external rectus muscle of the opposite eye. A typical case and one in which permanent esophoria resulted are reported in detail. J. Hewitt Judd.

Peter, L. C. **Technique of orthoptic training in squint.** Arch. of Ophth., 1935, v. 14, Dec., pp. 975-984.

The author outlines his method for treating squint cases, which are divided into four groups. The first includes children up to the age of four years, the second from four to seven years, the third from seven to eleven years, the fourth from twelve to twenty years. He concludes the most essential factors are the correction of amblyopia at an early age, the development of fusion by the synoptophore, surgical intervention to restore approximate parallelism, and then fusion training. J. Hewitt Judd.

Pinkerton, F. J., and Cowan, T. W. **Photographically recording the phorias.** Amer. Jour. Ophth., 1936, v. 19, Jan., p. 44.

Tertsch, R. **Another case of periarteritis nodosa with changes in the arteries of the extraocular muscles.** Zeit. f. Augenh., 1935, v. 87, Nov., p. 294.

Tertsch describes one case. The globes were free from changes but the arteries of the extraocular muscles resembled those of other parts of the body. The inflammatory process was limited strictly to the vessel wall, without extension to the surrounding tissues or signs of reaction in Tenon's space. At the foci of inflammation the characteristics of the vessel wall were indistinguishable and the tissues were heavily infiltrated with cells, predominantly leucocytes, though a few mononuclear cells, plasma cells, and large cells with pale nuclei occurred.

F. Herbert Haessler.

5. CONJUNCTIVA

Bistis, J. **On ocular allergy.** Arch. d'Opht., 1935, v. 52, Nov., p. 794.

Prolonged use of certain medications in the eye, such as atropin, pilocarpin, and mercurial preparations, sometimes provokes a conjunctivitis which disappears when the drug is withdrawn. Two such cases are reported, one due to zinc sulphate and the other to yellow oxide of mercury, both of which the author explains on the basis of allergy. (Bibliography.) Derrick Vail.

Blegvad, O., and Möller, H. U. **Artificial conjunctivitis.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 101.

Atypical membranous unilateral conjunctivitis occurred in four hysterical women. Two had used an irritating deodorizing solution and two had abraded the conjunctiva with sharp instruments. Such cases are more frequent than is supposed and the diagnosis can be made only on the rapid improvement which follows application of an occlusive bandage, making the eye absolutely inaccessible to the patient.

Ray K. Daily.

Busacca, Archimede. **The value of the nodules obtained after inoculation of trachomatous material into the vitreous.** Folia Clin. et Biol., 1935, v. 7, no. 4, pp. 180-182.

In a previous paper (Amer. Jour. Ophth., 1935, volume 18, page 984) the author had spoken of a virus resistant to glycerin. Stewart, however, had not found the trachomatous virus resistant to glycerin. Busacca now admits that his experiments were inconclusive on this point. W. H. Crisp.

Charamis, I. **Treatment of trachoma with bee-sting poison.** Klin. M. f. Augenh., 1935, v. 95, Nov., p. 660.

Charamis treated 43 patients with injections of trachocid, an atoxic painless derivative of the bee-sting poison, manufactured by the State Serotherapeutic Institute of Vienna. The antitrachomatous effect was satisfactory, especially in pannus. Corneal ulcers were more rapidly cicatrized than by other methods. Application to simple tarsoconjunctival trachoma in combination with other usual remedies, without surgical measures, produced more rapid cicatrization, but in acute conjunctival trachoma trachocid alone gave no definite results.

C. Zimmermann.

Charlin, Carlos C. **Microscopic cicatricial trachoma.** Klin. M. f. Augenh., 1935, v. 95, Oct., p. 518. (Ill.)

The corneal microscope shows that in cicatricial trachoma there is a whole group of objective and subjective changes which explain the ocular disturbances of such patients without macroscopic signs. These changes are benign, and immediately react to sulphate of copper. (Clinical histories.)

C. Zimmermann.

Dimissianos, B. **Exanthematous form of tuberculosis of the conjunctiva.** Arch. d'Opht., 1935, v. 52, Nov., p. 798.

A woman of forty years had had for eight years a dermatosis of the trunk and the upper and lower extremities, worse in the winter. Blood Wassermann was negative, and antiluetic treatment was of no avail. She complained of blindness in the right eye, of one year duration. Examination showed primary optic atrophy and vision zero. This was considered a result of trauma (skull injury) when she was fourteen years old. The left eye was of great interest. The conjunctiva of the lower lid was the site of many eruptive lesions arranged along the lid margin throughout its entire extent. Some of the lesions were flat, others elevated. Each showed at its center a small yellow or gray ulceration, surrounded by a reddish halo. The conjunctiva of the upper lid showed several similar lesions. Near the periphery of the cornea was a small cloudy opacity, in the center of which was a craterlike ulcer. There was a confluent exanthem of the skin of the trunk and forearms, characterized by multiple nodules, indurated, reddish, and hemispherical. Histologic examination of skin and conjunctival lesions showed necrosis, with lymphoid and epithelioid infiltration, characteristic of the papulonecrotic exanthem of Barthélemy, and probably tuberculous. (Illustrations, bibliography.)

Derrick Vail.

Edmund, Carsten. **Clinical studies of endogenous affections of the conjunctiva.** Acta Ophth., 1935, supplement 7.

This exhaustive clinical study supported by numerous case histories—the author's own and those gathered from the literature—attempts to characterize the various types of endogenous conjunctivitis associated with skin lesions, gold poisoning, rheumatism, and gonorrhea, in the hope that careful ophthalmic study may assist in establishing the etiology and diagnosis of the associated mucous or cutaneous lesion. The article is essentially a study of details, and does not lend itself to abstracting.

Ray K. Daily.

François, Jules. **Researches on the bacillus of Koch and tuberculous virus in trachoma.** Arch. d'Opht., 1935, v. 52, Dec., p. 875.

Injection of trachomatous conjunctival material into guinea pigs does not reveal the bacillus of Koch or tuberculous virus. Trachoma is not then of tuberculous nature. If tuberculosis sometimes seems to favor its development, it does so indirectly in lowering the resistance of the subject to trachomatous infection. (Bibliography.)

Derrick Vail.

Harrison, R. W., and Julianelle, L. A. **Studies on the infectivity of trachoma. 4. On the bacteria cultivable from trachoma and clinically similar conditions.** Amer. Jour. Ophth., 1936, v. 19, Feb., pp. 118-125.

Kleefeld, G. **Treatment of trachoma by chaulmoogra oil.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 16.

Under chaulmoogra-oil treatment all

the patients under the care of the writer were "literally transformed in appearance." In order to be effective the oil must penetrate the tissues. After abrading the conjunctiva definite friction is practiced with the oil. In old cases of trachoma with atrophic conjunctiva, parenteral injection of ethyl-esters of chaulmoogra has been remarkably successful, and the author recommends it in addition to any other form of treatment that may be used. (12 case histories.)

Jerome B. Thomas.

Sjögren, Henrik. **General symptomology and etiology of keratoconjunctivitis sicca.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 1.

From a study of the general symptomatology, blood-sedimentation reaction, blood count, and sugar tolerance of patients with conjunctivitis sicca, the author concludes that this type of conjunctivitis is not a disease entity but a local manifestation of a hematogenous chronic inflammatory process of the secretory glands, to which women are more predisposed than men. The chief feature of the disease is diminished secretion of the lacrimal and salivary glands, as well as of the glands of the mucous membrane of the upper respiratory tract. The process may be confined to one group of glands or involve them all. The reduction of secretion is caused by a chronic inflammatory process which leads to atrophy and sclerosis of the glandular parenchyma. Depending on the glands involved the result is keratoconjunctivitis sicca, xerostomia, rhinitis, pharyngitis, or laryngitis sicca. In keratoconjunctivitis sicca the microscopic picture is of chronic edema with atrophy of the epithelium. What part bacterial infections, toxic processes, allergic reactions, and endocrine disturbances play in the etiology of the disease has not as yet been determined.

Ray K. Daily.

Sjögren, Henrik. **Micropathology of the nasal glands in conjunctivitis sicca.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 40.

Photomicrographs of the nasal mucous membrane of a patient with keratoconjunctivitis sicca and rhinitis sicca show that the pathologic process consists principally in round-cell infiltration around and in the glands and in degeneration of the glandular epithelium. These findings give further support to the author's view that keratoconjunctivitis sicca, xerostomia, and rhino-pharyngo-laryngitis sicca are secondary symptoms of a disease of the glands.

Ray K. Daily.

Van der Straeten and Appelmans. **Ocular pemphigus.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 31. (See Amer. Jour. Ophth., 1936, v. 19, Jan., p. 62.)

Wojno, Zofia. **A case of progressive perforating scleromalacia.** Klinika Oczna, 1935, v. 13, pt. 4, p. 778.

In the course of a debilitating illness diagnosed as grippe, a woman of 72 years developed progressive pericorneal ulceration of both eyeballs, due probably to a trophic disturbance. The cornea was insensitive and its periphery was vascularized in the superficial layers. Vision was greatly reduced. In spite of treatment the ulceration progressed in size and depth, until the ciliary body was exposed. Both eyeballs finally ruptured and the patient died. The case differs from Van der Hoeve's cases, reported under the name of perforating scleromalacia, in absence of disease of the joints and in involvement of the conjunctiva.

Ray K. Daily.

6. CORNEA AND SCLERA

Brav, Aaron. **Familial nodular degeneration of the cornea.** Arch. of Ophth., 1935, v. 14, Dec., pp. 985-986.

A man aged 40 years showed typical bilateral involvement of the cornea. Three sisters, aged 36, 37, and 38, and a daughter, aged 14 years, showed a similar condition.

J. Hewitt Judd.

Green, John. **Bullous keratitis; a rational therapy.** Trans. Amer. Ophth. Soc., 1935, v. 33, pp. 158-166. (See Amer. Jour. Ophth., 1936, v. 19, Jan., p. 16.)

Opin and Reboul. **Marginal dystrophy of the cornea in young subjects.** Arch. d'Opht., 1935, v. 52, Nov., p. 771.

This disease, especially rare in young adults, was described first by Terrien in 1900. The authors report a case occurring in a married woman 31 years old, a farm worker. Both corneas showed ectasia of the upper part, limited below by a grayish white line. The ectasia was transparent by direct illumination, cloudy on transillumination. Intraocular tension was normal. Visual acuity, with a high amount of mixed astigmatism corrected, was 0.5 right and 0.4 left. The pathogenesis of this disease is unknown. Lipoid infiltration may play a part, or the malformation may be a consequence of inflammatory lesions, probably ulcerative. (Bibliography.) Derrick Vail.

Pickard, Ransom. **Varicella of the cornea.** Brit. Jour. Ophth., 1936, v. 20, Jan., p. 15.

The author refers to Oppenheimer's case and discusses one observed by himself in a boy aged ten years. The slitlamp showed the cornea swollen in the region of the opacity, not bulging forward but toward the anterior chamber. The opacity occupied about one fourth the area of the cornea. The surface was gray with crenated edges. On the posterior surface the lesion appeared as a flat brownish mass with a spongy free surface. The corneal affection began about three weeks after onset of the disease, and the local inflammation subsided rapidly. The cornea cleared approximately in eight months.
D. F. Harbridge.

Sjögren, Henrik. **General symptomology and etiology of keratoconjunctivitis sicca.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 1. (See Section 5, Conjunctiva.)

Sugita, Yozo. **The colloidal chemical significance of Bowman's and Descemet's membranes.** Graefe's Arch., 1935, v. 134, p. 321.

With cattle eyes fresh from the slaughterhouse, preparations were made of Bowman's membrane with a thin layer of the corneal stroma, of Descemet's membrane with a thin layer of the corneal stroma, and of a thin layer only of the corneal stroma. Together with the adjoining sclera posteriorly to half the depth of the eyeball, each preparation was firmly tied over the end of a small glass cannula, into which 1 c.c. of a colloid or crystalloid solution was poured. Colloid substances could not penetrate the preparations containing Bowman's or Descemet's membrane, but could pass easily through the isolated thin layer of corneal stroma. Crystalloid substances always passed through all three preparations with equal facility. The author therefore concludes that Bowman's and Descemet's are perfect dialyzing membranes. H. D. Lamb.

Wojno, Zofia. **A case of progressive perforating scleromalacia.** Klinika Oczna, 1935, v. 13, pt. 4, p. 778. (See Section 5, Conjunctiva.)

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Comberg, W. **Can a blind eye experience photophobia?** Det oft. Selskab i Köbenhavn's Forhandlinger, 1934-1935, p. 1. In Hospitalstidende, 1935, Dec. 17.

The author has often found a reaction to light in a blind eye, sometimes accompanied by marked pain, even when the other eye was perfectly normal. It is assumed that the tissues of the anterior segment of the eye are irritated by the light. This symptom might be explained on the basis of a sympathetic reaction, and in many cases enucleation of the blind eye has been advised on this theory.
D. L. Tilderquist.

Duc, Camillo. **The Argyll Robertson symptom in nonluetic affections.** Ann. di Ottal., 1936, v. 63, Nov., p. 855.

The author describes five cases and urges that precise ocular phenomena should be indicated rather than merely stating that the Argyll Robertson pupillary reaction was present. The symptoms which have been regarded as pathognomonic may be found in the absence of lues. But in excluding lues it

is necessary to determine any other intercurrent condition that may have etiologic significance. (Bibliography.)
Park Lewis.

Guillery, H. **Specific and nonspecific toxin action in sympathetic ophthalmia.** Arch. f. Augenh., 1935, v. 109, Dec., p. 474.

De Andrade's recent findings that different phosphatids like phytin, lecithin, and cholesterin are able to produce in the uvea a pathologic alteration similar to that found in sympathetic ophthalmia are interpreted as supporting the author's own theory that sympathetic ophthalmia is of tuberculotoxic origin. R. Grunfeld.

Joy, H. H. **A survey of cases of sympathetic ophthalmia occurring in New York State.** Arch. of Ophth., 1935, v. 14, Nov., pp. 733-741.

This report is based on 158 cases reported in answer to a questionnaire. The diagnosis was confirmed in 41 of the 48 globes examined microscopically. The findings are tabulated and discussed as to chronologic incidence, sex and age, exciting cause, and interval between injury and onset. Six cases occurred subsequent to enucleation of the exciting eye, five were postoperative and four apparently resulted from nonperforating injuries. The author concludes that the frequency of this disease is not decreasing. It may be feared for two months after enucleation of the exciting eye. Enucleation before onset of sympathetic inflammation, if delayed 26 days or more after the injury, does not favorably influence the ultimate result. The disease is unusually severe in children and after cataract extraction.
J. Hewitt Judd.

Kraupa, Ernst. **Increase of tension in acute angioneurosis of the ciliary body (glaucoma allergicum) in its relation to cyclitis and heterochromic glaucoma.** Arch. f. Augenh., 1935, v. 109, Dec., p. 416. (See Section 8, Glaucoma and ocular tension.)

McKee, S. H. **Metastatic ophthalmia in a case of pneumonia: bacteriological findings.** Trans. Amer. Ophth. Soc., 1935, v. 33, pp. 393-396. (See Amer. Jour. Ophth., 1935, v. 18, Dec., p. 1145.)

Olsson, G. F. **A case of sympathetic ophthalmia after Holth's iridencleisis.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 61.

Two months after iridencleisis for simple glaucoma in the right eye, the left eye developed sympathetic ophthalmia, and it was subsequently enucleated. The author reviews the literature in order to determine the comparative safety of Elliot's trephining and Holth's iridencleisis, relative to late infection and sympathetic ophthalmia. He found one other case of sympathetic ophthalmia following iridencleisis for glaucoma, reported by Herbert, and six cases following Elliot's operation, discussed by Schonenberger. Relative to late infection the statistics are in favor of iridencleisis. Ray K. Daily.

Tooke, Frederick. **Tuberculosis of the choroid associated with generalized miliary tuberculosis.** Brit. Jour. Ophth., 1936, v. 20, Jan., p. 23.

A male infant aged thirteen months suddenly became restless, developed convulsions, and died. The record is illustrated by a tuberculin reaction chart, a chest roentgenograph, and four photomicrographs. Tuberculous meningitis is a late rather than an early manifestation of the course of the disease. In certain cases tubercles of the choroid are coincident rather than complicating manifestations of tuberculous meningitis. D. F. Harbridge.

Waldmann, Béla. **Details as to occurrence of sympathetic ophthalmia, based on international statistics, and knowledge deducible from them.** Arch. f. Augenh., 1935, v. 109, Dec., p. 441.

Internationally gathered statistical data showed that sympathetic ophthalmia appeared between October and April four times as frequently as between May and September. This seasonal incidence suggests that the causative agent is ectogenous, most likely rhinogenous. According to the author the iridocyclitis in sympathetic oph-

thalmia usually starts out with an optic neuritis, and this he argues proves that the optic nerve plays an important part in transmission. R. Grunfeld.

Woods, A. C. **Sympathetic ophthalmia,** part 2. Amer. Jour. Ophth., 1936, v. 19, Feb., pp. 100-109.

8. GLAUCOMA AND OCULAR TENSION

Abramovicz, I. **Histologic study of Szymanski's modification of Elliot's operation.** Klinika Oczna, 1935, v. 13, pt. 4, p. 709.

To demonstrate the anatomic effect of this operation, which consists in trephining a semilunar piece of sclera from the angle of the anterior chamber, the author performed the operation on an eye condemned to enucleation because of peripapillary sarcoma of the choroid. The eye was enucleated ten days after the operation and the microscopic sections confirm the soundness of Szymanki's procedure and of deductions from experiments on animals.

Ray K. Daily.

Appelmans. **Encephalotrigeminal angiomatosis.** Arch. d'Opht., 1935, v. 52, Dec., p. 835.

A man of 47 years had never seen well with the left eye. It was violet colored, like the skin of the left side of the face, and larger than the right. It had been removed several years before, following acute glaucoma. The entire left side of the face, except the inferior maxillary region, was covered with a mixed type of angioma, tuberous and flat. Its borders were sharply defined, limited to the area supplied by the first two branches of the trigeminal nerve. The mucous membranes of the socket, left side of nose and palate, and cheek were angiomatous. Roentgenographs showed angiomatous dilatations irregularly disseminated along the internal surface of the cranial vault. The right eye was normal. Angiomata of the cutaneous area innervated by the two superior branches of the trigeminal nerve are frequently associated with glaucoma and intracranial angioma. Ocular and intracranial lesions frequently coexist with a nevus of the face which does not present any sharp radicular disposition. The title "neurocutaneous angiomatosis" is proposed. The glaucoma associated with angiomatosis seems to be of neurovascular origin. (Illustrations, bibliography.)

Derrick Vail.

Barkan, O., Boyle, S. F., and Maisler, S. **On the surgery of glaucoma: mode of action of cyclodialysis.** California and Western Med., 1936, v. 44, Jan., p. 12. (See Amer. Jour. Ophth., 1936, v. 19, Jan., p. 21.)

Berens, Conrad. **A curved keratome for sclerectomy operations.** Trans. Amer. Ophth. Soc., 1935, v. 33, p. 396. (See Amer. Jour. Ophth., 1935, v. 18, Nov., p. 1053.)

Gradle, H. S. **The effects of mydriatics upon intraocular tension.** Trans. Amer. Ophth. Soc., 1935, v. 33, pp. 175-180. (See Amer. Jour. Ophth., 1936, v. 19, Jan., p. 37.)

Granström, K. O. **Nevus flammeus associated with glaucoma.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 115.

The nevus occurred in the area of distribution of the second division of the left trigeminal nerve, associated with simple glaucoma of the left eye. Histologically the enucleated eye contained a moderate disc-like thickening of the posterior portion of the choroid, consisting of telangiectases. Brief review of the sixty cases of nevus flammeus associated with glaucoma reported in the literature shows that where anatomic examinations were made the eyes contained uveal vascular changes of a telangiectatic nature. That nevus flammeus may occur without vascular abnormalities in the uvea is shown by four brief case reports in which there was no mention of fundus changes or rise of tension. The author therefore regards nevus flammeus as a result of a developmental vascular disturbance which may be limited to the blood vessels of the skin or may involve the vessels of the brain and uvea. When nevus flammeus is associated with glau-

coma the author attributes the rise in tension to the uveal telangiectasis.

Ray K. Daily.

Holst, J. C. **Results of iridencleisis in glaucoma simplex from 1928 to 1932.** Acta Ophth., 1934, v. 12, pt. 4, p. 348.

This is a study of the material at the Oslo University Eye Clinic. Of 534 operated upon 281 eyes could be followed for one year. These eyes showed 83.6 percent of good results relative to vision, 96.6 percent relative to visual fields, and 90.8 percent relative to tension. Posterior synechiae which apparently had no injurious effect were found in forty-two percent. In this series of cases there seemed to be no relation between ocular tension and the presence of a cystic scar, or between cataract and hypotension. Ray K. Daily.

Joiris, P. and Fanchamps, J. **Glaucoma, facial angioma, cerebral angioma.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 92.

Oculists have noted parallel development of glaucoma and facial nevus; neurologists, the coëxistence of nevus and epilepsy, or other troubles of nervous origin. There is a third category of patients showing at the same time glaucoma, facial nevus, and nervous symptoms related to intracranial angiomatous tumor. The writer reports on two such patients, a child of 4½ and a woman of 25 years. Radiograms were negative as to cerebral angioma. In discussion, H. Coppez reported the case of a child of eight years with a nevus of one half of the face, hydrophthalmos, and Jacksonian epilepsy; cranial decompression showing an angioma of the leptomeninges over the motor zone.

Jerome B. Thomas.

Kraupa, Ernst. **Increase of tension in acute angioneurosis of the ciliary body (glaucoma allergicum) in its relation to cyclitis and heterochromic glaucoma.** Arch. f. Augenh., 1935, v. 109, Dec., p. 416.

The author describes a rare disease entity of unknown etiology which recurs periodically without known cause in men of middle age with angiopathic and degenerative constitution (status dysraphicus). It makes its appearance in the form of primary glaucoma, but after the hypertension subsides it reveals itself as a cyclitis with precipitates on Descemet's membrane which disappear after fourteen days. Transudation of the protein is most likely due to a vasoneurotic lesion of the ciliary body on an allergic basis. Paracentesis is the only effective procedure, and is instantaneously beneficial. The typical antiglaucomatous procedures, including the use of miotics, prove ineffectual.

R. Grunfeld.

Woods, A. C. **The use of an extract of adrenal cortex in glaucoma.** Arch. of Ophth., 1935, v. 14, Dec., pp. 936-946.

The literature is reviewed and twelve cases are reported in which adrenal cortex extract was given, intramuscularly in eleven and intravenously in one. The intraocular tension was taken immediately before the injection, and at intervals of one-half hour up to four hours afterward. In three patients there was no change in tension; in two, minor fluctuations; in three, a rise which was apparently not related to the injection; and in three, minor falls in tension. In five patients concentration of chloride, sodium, and potassium in the blood plasm showed no alteration after administration of adrenal cortex. The author finds no support for the theory of the pathogenesis of glaucoma advanced by Josephson, or for therapeutic use of this extract. J. Hewitt Judd.

9. CRYSTALLINE LENS

Badot, J. **A case of recurrent spontaneous luxation of the lens into the anterior chamber.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 58.

A report of a single case.

Campbell, D. A. **Glutathione in the blood in senile cataract and other ocular conditions.** Brit. Jour. Ophth., 1936, v. 20, Jan., p. 33.

The work of other investigators is presented in tabular form. There is no marked variation in the reduced glutathione of the blood, with age or diet, or in senile cataract as compared with

other ocular conditions. The range for all cases of ocular disease is within the normal. In comparison with reduced glutathione, oxidized glutathione shows considerable variation, especially in noncataract cases, but no significant change. D. F. Harbridge.

Dodge, W. M., Jr. **Histopathologic characteristics of nutritional cataract in the white rat.** Arch. of Ophth., 1935, v. 14, Dec., pp. 922-935.

The effect of various diets on the lens in 145 rats is recorded, tabulated, and illustrated by photomicrographs. One group was fed a diet containing seventy percent lactose. Others were given this diet with the addition of either calcium gluconate, di-ethylene-glycol mono-ethyl ether, viosterol, or butter. Others were given diets of dry skimmed milk or whole dry milk, with and without iron. Control rats were given a diet containing seventy percent starch or seventy percent maltose, and in none of these were any changes found in the lens. Diets high in carbohydrates (lactose) produced microscopic changes in the lens. The use of dry skimmed milk reduces the magnitude of these changes, but di-ethylene-glycol mono-ethyl ether has no influence on production or retardation of lens changes. No appreciable deposits of glycogen were found. J. Hewitt Judd.

D'Ombrain, A. W. **Tremulous lens.** Brit. Jour. Ophth., 1936, v. 20, Jan., p. 22.

A man aged fifty years, with cataract, developed a severe iridocyclitis. After the inflammation subsided it was discovered that the lens was tremulous but that the iris remained stationary. The writer attributes the phenomenon to fluidity of the vitreous resulting from the severe iridocyclitis.

D. F. Harbridge.

Fischer, F. P. **The flavin content of the lens.** Arch. f. Augenh., 1935, v. 109, Dec., p. 468.

The normal lens contains two groups of fluorescing substances, flavin of the vitamin-B complex, and dimethyl-alloxazine. In cataractous lenses flavin is replaced by lumiflavin, which is never present in the normal lens and is a photolytic end-product of flavin. The normal lens seems to be able to prevent photolysis of flavin; and the cataractous lens is thus deprived of an important respiratory agent. R. Grunfeld.

Heinonen, Oskar. **The morphology of tetany cataract.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 70.

In two cases tetany and subcapsular lenticular opacities developed after thyroidectomy. A study of tetanic cataracts leads the author to conclude that the disturbance in the parathyroid metabolism causes a cessation in growth of the lenses. With adjustment in the calcium metabolism, spontaneously or through therapy, the growth of the lens is resumed and the initial subcapsular opacity is crowded deeper into the cortex by the newly formed fibers. The author found therapy ineffective in arresting the growth of the cataract.

Ray K. Daily.

Kapuscinski, W. J. **Technique of intracapsular cataract extraction.** Klinika Oczna, 1935, v. 13, pt. 4. p. 703.

Bacteriologic study of the conjunctival sac, akinesis, paralysis of the levator, bridle suture of the superior rectus, conjunctival sutures, iridotomy, and extraction with Elschnig or Kalt forceps are features of the author's technique. Ray K. Daily.

Müller, H. K. **About the formation of vitamin C (ascorbic acid) in the lens.** Arch. f. Augenh., 1935, v. 109, Dec., p. 434. (See Amer. Jour. Ophth., 1936, v. 19, March, p. 271.)

Ray, S. N., Gyorgy, P., and Harris, L. J. **Effect of deficiency of vitamin-B complex on the "redox" system in the eye-lens.** Biochem. Jour., 1935, v. 29, March, p. 735.

The amount of vitamin C in the lens is found to be very low in rats fed on diets deficient in various constituents of the vitamin-B complex. This metabolic disorder of the lens appears to be due to a deficiency in some factor which is not identical with vitamins B_1, B_2, H

or A. The nature of this factor is unknown but raw egg-white is a potent source of it. Edna M. Reynolds.

Van Duyse, M. **A case of atypical coloboma of the lens; considerations on its pathogenesis.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 86.

Typical coloboma of the lens in most cases accompanies other malformations, such as coloboma of iris ciliary body or choroid. Atypical coloboma occurs without other defects in 85 percent of the cases. The writer reports a case of atypical coloboma of the lens in a child of eight years and briefly reviews theories of pathogenesis. He concludes that the coloboma may be produced by several factors but that the zonular theory fits his observation most exactly. (Two figures, 10 references.)
Jerome B. Thomas.

Woodruff, H. W. **Management of complications in the operation of senile cataract.** Amer. Jour. Ophth., 1936, v. 19, Feb., pp. 146-150.

Yudkin, A. M., and Arnold, C. H. **Cataracts produced in albino rats on a ration containing a high proportion of lactose or galactose.** Arch. of Ophth., 1935, v. 14, Dec., pp. 960-966.

The group fed a diet containing 70 percent dextrose or corn starch showed no ocular changes. The second group was fed a diet containing 70 percent lactose, and the third group one containing 50, 35, or 25 percent galactose, with corn starch making up the difference. Lactose produces lens changes in from 70 to 94 days, hence all the cataracts are cortical. Galactose acts more rapidly, producing nuclear cataracts in young animals and cortical cataracts in older animals. J. Hewitt Judd.

10. RETINA AND VITREOUS

Coppez, L. **Presentation of patients operated upon for retinal detachment by pyrometric diathermo-coagulation.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 11.

The writer presents the case histories of seven patients chosen from some sixty thus operated upon.

Dalsgaard-Nielsen, Esther. **Arterial loops in the vitreous.** Acta Ophth., 1934, v. 12, pt. 4, p. 385.

Three cases are reported. These preretinal loops have no pathologic significance. Embolism of such loops has been reported in two cases, and the author thinks that the looping of the artery may have favored arrest of the embolus. Ray K. Daily.

DeJean, Ch. **Secondary intraocular gliosis.** Arch. d'Opht., 1935, v. 52, Dec., p. 863.

The author discusses glial formation in the retina and compares it with that in the nervous system generally. He concludes that neuroglial cicatricial proliferation is more frequent than is supposed. As in the rest of the nervous system its appearance and extension are very likely a function of slowness of cicatrization of a penetrating wound or a deep infection. Neuroglia appears to be especially abundant in long degenerated globes. The presence of foreign bodies and the products of tissue degeneration also favor glial proliferation. In certain circumstances the ciliary retina also appears able to produce neuroglial transformation, which is explained by its embryonic origin. (Illustrations.) Derrick Vail.

Ehlers, Holger. **Results derived from diathermy treatment of retinal detachment.** Acta Ophth., 1935, v. 13, pt. 1-2, p. 131.

A tabulated report of 31 unselected cases treated by Larsson's or Weve's technique shows that in six cases the retina reattached and vision was improved. (Illustrations.)
Ray K. Daily.

Endelman, Leon. **Fundus studies in patients with hypertension.** Klinika Oczna, 1935, v. 13, pt. 4, p. 745.

Following a review of the literature the author presents a tabulated report of the fundus findings of 73 clinic and 72 private patients with hypertension, grouped into essential hypertension, glomeronephritis, malignant nephrosclerosis and general arteriosclerosis.

The table shows that fundus examination is of no value in the differential diagnosis of hypertension, but is valuable from a prognostic standpoint. The author disagrees with Guist, who considers corkscrew tortuosity of the macular veins indicative of essential hypertension. Ray K. Daily.

François, J. **A new case of vascular anomalies of the retina and of venous anastomoses on the papilla.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 66.

A previous case reported by the writer was similar in appearance but seemed due to ocular hypertension. In the present case the vascular anomalies are explained as indicating difficulty in collateral circulation consecutive to venous thrombosis the pathognomonic symptoms of which have now disappeared. (Three figures.)

Jerome B. Thomas.

François, J. **Pigmentary degeneration of the retina through dominant heredity.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 79.

Transmission is usually recessive. Consanguinity of the forbears is noted in a striking number of cases, 27 percent according to Bell. Dominant transmission is rare, but the author regards it as probable where the affection is transmitted directly during three generations or more. He has established the genealogy of a family through five generations, several members having been affected, and he makes the following observations: (1) Transmission was dominant. Only affected persons transmitted the disease, and the children of the sound parents were all normal. While according to Mendel's law fifty percent of the children should have been normal and fifty percent affected with pigmentary degeneration of the retina, this law of proportional numbers does not apply strictly in human descent. (2) Of forty members of the family studied, extending through five generations, thirteen are certainly affected. Sex-linked heredity was not confirmed. (3) There was no consanguineous marriage in the family. (4) None of the affected members presented complications (deafness, deaf-mutism, diseases of the central nervous system). This confirms the opinion of Nettleship and of Wibaut that in the dominant type of pigmentary degeneration of the retina complications are absent or at least much more rare than in the recessive type, a difference so striking that certain authors classify two affections. (Bibliography.) Jerome B. Thomas.

Friedenwald, J. S., and Stiehler, R. D. **Structure of the vitreous.** Arch. of Ophth., 1935, v. 14, Nov., pp. 789-808.

Studies were conducted on the bovine vitreous as to the viscosity of the filtrate and the structure and disposition of the residual protein. The authors conclude that the vitreous has a framework composed of extremely thin, concentrically arranged sheets of vitrein or residual protein. The spaces between these sheets are filled with a viscous fluid, the viscosity of which is responsible for turgor of the vitreous.

J. Hewitt Judd.

Fritz, A. **Dicrotic retinal pulse.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 97.

The form of the arterial pulse is the more complex the nearer the heart one makes the observation. The dicrotic wave is plain in the carotid pulse and in the brachial pulse in most cases, but in the retina the arterial pulse is limited generally to one systolic dilatation of the artery followed by a diastolic contraction. Rarely, the atonicity of the arteries may be so marked that a dicrotic wave appears in the retinal pulse. The relationship of this form of pulse to a pathologic, atonic state of the walls of the retinal arteries is demonstrated by the fact that one may cause it to disappear by tonic therapy.

Jerome B. Thomas.

Fritz, A. **Physiopathologic exploration of the capillary circulation of the retina.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 100.

In blanching of the papilla under compression of the ocular globe one has a possible measure of capillary pressure. The degree of color of the papilla depends upon fullness of the capillary

network. One is struck by the analogy between the appearance of a normal disc subjected to compression and that of an atrophic disc. If a disc is pale only a small number of its capillaries are permeable. We may have to combine the two factors of pressure and of capillary permeability in a series of physiologic states in which considerable permeability will be accompanied by low pressure, whereas feeble permeability will be normally overcome by raised capillary pressure. Every alteration of these physiologic values would bring about a congestive or ischemic state of the tissues. The text is illustrated by a series of photographs of the optic disc taken under pressure on the globe varying from 0 to 120 mm. Hg; and by a colorimetric curve showing the relation between the color of the disc and the degree of capillary pressure. Jerome B. Thomas.

Homma, R. **Experimental observations on the pathologic secretory function of the retinal pigment epithelium.** Graefe's Arch., 1935, v. 134, p. 305.

Three rabbits were injected intravenously with 7 to 10 c.c. of Septojod. Four to nine days later, the animals were killed and the eyeballs sectioned. The microscope showed a primary injury of the retinal pigment epithelium leading to a pathologic secretion from it. Two rabbits were fed by mouth with 1 gm. of naphthalin daily for eight days in one animal and five days in the other. Sections from the eyeballs of both animals showed secretory activity of the retinal pigment epithelium. In another rabbit, after puncture of the anterior chamber, 0.2 c.c. of sheep's serum was injected into the vitreous of one eye. When sectioned twelve days later, this eye had small secretory drop formations clinging to the inner surface of the pigmented epithelial cells. Detachment of the retina did not occur in any of these cases, because normally in the rabbit eye there is firm union between the retina and the pigment layer.

H. D. Lamb.

Krause, A. C. **The lipoids of the retina.** Acta Ophth., 1934, v. 12, pt. 4, p. 372.

A tabulated report of the qualitative and quantitative lipoid content of bovine retinal neuroepithelium.

Ray K. Daily.

Möller, H. U. **Pseudoxanthoma elasticum and angioid streaks in the retina.** Det oft. Selskab i Köbenhavn's Forhandlinger, 1934-1935, pp. 8-11, In Hospitalstidende, 1935, Dec. 17.

The cases of a woman of 39 years and her brother, aged 31 years, are described. One other sister, who had died at the age of thirty years, had been afflicted with the disease. The mother's parents had been cousins. The skin changes had been detected at the ages of ten and twelve years respectively, but no complaints as to vision had been made until within the last year and consequently no examinations of the fundi had been made. The retinae showed the typical appearance of the disease, with involvement close to and even in the macular region. Both gave strong positive reactions to tuberculin tests and neither responded favorably to any form of treatment..

D. L. Tilderquist.

Rubbrecht, R. **Thoughts on the pathogenesis of retinal detachment.** Arch. d'Opht., 1935, v. 52, Nov., p. 786.

The author believes that retinal detachment occurs because the normal power of adhesion between retina and choroid is weakened. The tear is result, not cause. Successful treatment occurs when the weakened adhesive power of the retina is strengthened artificially by coagulation. It is therefore not necessary to close the tear, which will close of itself if the surrounding retina is back in place. Derrick Vail.

Rubbrecht, R. **Suture of the retina.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 44.

The report includes two cases of retinal detachment treated by sutures which were allowed to remain in place three days. In both cases reattachment was complete and satisfactory. The text is illustrated by four figures, two showing microscopic sections of the eye of a hare in which a suture had been left

in place three days, the eye being enucleated five days later.

Jerome B. Thomas.

Spaeth, E. B. **The reattached retina; physiologic, ophthalmoscopic and microscopic observations and comparisons.** Arch. of Ophth., 1935, v. 14, Nov., pp. 715-732.

Based on the literature and the examination of a globe removed after a successful reattachment by means of the Guist-Lindner technique, it is concluded that the degree of recovery depends upon the presence of healthy rods and cones, and the absence of irregular subretinal cells, which probably are proliferated pigmented epithelial cells. If cholesterol crystals are present, degeneration is extensive and failure is certain. Examinations of the color vision showed disturbances principally for blue and green. While the findings are not constant, it is probable that the reattached retina has markedly defective scotopic mechanism. Investigation of the threshold of light sense showed a loss much greater than that of visual acuity. The ophthalmoscopic appearance of the reattached retina is discussed and is illustrated by a colored plate. J. Hewitt Judd.

Van Heuven, J. A. **The localization of the retinal hole.** Brit. Jour. Ophth., 1936, v. 20, Jan., p. 39.

At the end of a glass bar ranging in thickness from 3 to 1.5 mm. is a flattened knob. Through a narrow lumen runs a platinum wire. The bar is curved to the contour of the eyeball. It is silvered and varnished on the outer surface, but at the flattened knob the varnish is removed. The curved rod is passed under the conjunctiva in the supposed area of the retinal hole and the sclera is transilluminated. Under ophthalmoscopy the two lights are made to coincide with the hole. When this is accomplished a diathermy current is allowed to run through the platinum wire, burning a small spot on the sclera, and thus locating the position to be operated upon.

D. F. Harbridge.

Veil, P., and Dollfus, M. A. **Comparative value of different techniques of obliteration of retinal tears.** Arch. d'Opht., 1935, v. 52, Nov., p. 781.

This paper is a statistical study of more than 300 cases in which various methods of surgery of retinal detachment were carried out, including thermocautery (Gonin), cryocautery, chemical cautery (Guist), and diathermy. Ignipuncture is the method of choice when the tear is small, single and easily accessible. Exact localization is essential. The method is not recommended where there are large multiple tears or disinsertions which necessitate multiple puncture. Juxtachoroidal galvanocauterization (Veil) is indicated in these latter cases and gave excellent results. Nonperforating galvanocauterizations do not produce hypotony, and they permit as many points as are necessary to circumscribe the area involved. The Guist operation has been abandoned. The technique of cryotherapy has too many disadvantages. Diathermy permits operation under direct ophthalmoscopic control, but requires longer rest in bed and longer observation than thermal methods.

Derrick Vail.

Vogt, Alfred. **Hyaloid canal with area Martegiani and symmetrical posterior hyaloid foramen.** Zeit. f. Augenh. 1935, v. 88, Dec., p. 1.

Vogt outlines briefly the results of attempts to stain the hyaloid canal, which will be reported in detail in an essay from his clinic, and he describes the clinical findings in a patient with duplex posterior hyaloid membrane coincidental with a recent spontaneous retinal detachment. From these observations, he concludes that the hyaloid canal does exist and that posteriorly it develops a funnel-like enlargement before becoming inserted in the peripapillary retinal tissue in the area Martegiani. The newly discovered annular posterior detachment of the vitreous probably has this posterior attachment as its anatomical substratum. The existence of a posterior limiting membrane of the vitreous which occasionally becomes detached from the internal

limitans of the retina can no longer be doubted. The membrane is probably extended to line the canal, so that the entire vitreous surface is covered with a limiting membrane.

F. Herbert Haessler.

Walsh, F. B., and Sloan, L. L. **Results of cervical sympathectomy in pigmentary degeneration of the retina.** Arch. of Ophth., 1935, v. 14, Nov., pp. 699-714.

The authors review the literature and tabulate the findings in the cases previously reported, showing that unquestionable improvement is infrequent. Three cases which were subjected to cervical sympathectomy are reported. Failure resulted in two cases, but in the third there was slight benefit as shown by improvement in the fields and light sense. The improvement was bilateral, although the operation was done only on the right side. No increased size of the retinal arteries was noted. (Adaptation curves, perimetric charts.) J. Hewitt Judd.

Weve, H. **About "ablatio falciformis congenita."** Arch. f. Augenh., 1935, v. 109, Dec., p. 371.

In fourteen eyes of eight children the author found a retinal fold extending like a sail from the optic disc to the region between lens and ciliary body, but usually not connected with either of them. Inflammatory signs were missing. The epipapillary membrane suggests a congenital malformation most likely of mesodermal origin. while the abundance of hematogenous pigment pointed to hemorrhage into the membrana vasculosa lentis or into the primary vitreous body. This familial and congenital anomaly is found unilaterally or bilaterally in different grades of development. When bilateral, it is associated with nystagmus, convergent strabismus, and poor vision.

R. Grunfeld.

Wright, R. E. **Technique for accelerating the Guist-Lindner operation for retinal detachment.** Arch. of Ophth., 1935, v. 14, Nov., pp. 815-816.

The author advocates the use of the Green mechanical trephine. As an irritant he prefers chromium dioxide fused on a silver wire. J. Hewitt Judd.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Hamilton, J. B. **A case of chlorosis with ocular complications.** Brit. Jour. Ophth., 1936, v. 20, Jan., p. 18.

This condition has almost disappeared from medical literature. The patient was a female, aged 33 years, showing the general and blood evidence of the malady. Vision was normal, but there was papilledema of three diopters in each eye. The condition disappeared under treatment and the patient has remained well during the past year.

D. F. Harbridge.

Mans, R. **Partial excavation of optic disc without increase of intraocular tension.** Det oft. Selskab i Köbenhavn's Forhandlinger, 1934-1935, p. 2. In Hospitalstidende, 1935, Dec. 17.

A case of optic degeneration and cupping without any demonstrable increase of tension had been watched for over ten years. A probable cause was then suggested by the finding, in roentgen films, of calcified arteries at the base of the brain, which by pressure on the optic nerves might bring about optic atrophy. D. L. Tilderquist.

Walsh, F. B. **Neuromyelitis optica.** Bull. Johns Hopkins Hosp., 1935, v. 56, April, p. 183.

The case reported in detail is that of a child aged nine years who died six weeks after onset of an ascending motor and sensory paralysis accompanied by blindness. Autopsy findings showed multiple foci of demyelinization in the brain with involvement of the optic nerve and extensive demyelinization of the spinal cord. Careful differentiation is made detween this condition and brain tumor, which diagnosis was made in two of the four cases reported. Acute multiple sclerosis and diffuse encephalomyelitis are also differentiated.

Edna M. Reynolds.

12. VISUAL TRACTS AND CENTERS

Barkan, O., and Boyle, S. F. **Paracentral homonymous hemianopic scotoma.**

Arch. of Ophth., 1935, v. 14, Dec., pp. 957-959.

A woman of sixty years was struck on the left side of the head by a basketball. From the history, the defects in the field seemed at first to have involved both macular regions and perhaps a larger quadrant which later retracted from the macular region and resolved itself into circumscribed paracentral scotomas, which are illustrated by a perimetric chart. Rest and general care apparently give improvement in these cases. J. Hewitt Judd.

Heine, L. **The decussation of nerve fiber tracts and bilateral symmetry.** Zeit. f. Augenh., 1935, v. 88, Dec., p. 7.

Heine briefly and speculatively deals with the possible cases of decussation in the central nervous system. It seems unlikely to him that the optic pathway decussates in order to rectify the image produced by the animal lens and that all other tracts must decussate in harmony with it, as postulated by Ramon y Cajal. Rather is general decussation a factor of safety in double innervation of all motor members such as arm and leg. When such double innervation was extended to the eye, binocular single vision and stereopsis became possible.
F. Herbert Haessler.

Müller, H. K. **Pupillotonia and Adie's disease.** Zeit. f. Augenh., 1935, v. 88, Dec., p. 20.

Pupillotonia is usually unilateral, and the affected pupil is very irregular and larger than the normal one. The chief characteristic is very slow but complete contraction in adjustment to near vision and an even slower recovery. There is a long latent period before contraction or recovery begins. To direct and consensual light there is apparently no reaction, though after a long stay in the dark room the pupil dilates and will then react to sudden strong light. Pharmacologic reactions are normal. Adie and Behr ascribe this phenomenon to disturbance of the vegetative part of the oculomotor nucleus. Pupillotonia is associated with absence of tendon reflexes. Adie believed it to be part of a benign ascending areflexia of unknown etiology. This, however, is only true of 75 percent of the 101 cases which have been studied. Lues definitely plays no part, but the syndrome may be a sequel of encephalitis, migraine, diphtheria, chronic alcoholism, trauma, herpes zoster, myotonia congenita, and progressive muscular atrophy.
F. Herbert Haessler.

13. EYEBALL AND ORBIT

François, J. **Traumatic enophthalmos and its pathogenesis.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 71.

This condition is relatively rare judging by the number of published cases. Probably many more cases are observed but not reported. In the author's case (illustrated with three figures including a radiogram of the orbit) the cause of retraction of the globe may have been resorption of orbital fat after nerve lesions, contraction of retrobulbar cicatricial tissue, or tearing of the suspensory ligaments of the globe.
Jerome B. Thomas.

Lebas, J., and Hubert, J. **Total repair of an ordinary cavity by dermo-epidermal graft on a previously reformed stump.** Bull. Soc. Belge d'Opht., 1935, no. 70, p. 40.

In the Bulletin of 1934 the authors advised inclusion of an intrascleral glass ball. In the present case of total symblepharon they combined this procedure with dermal grafts, with excellent result which permitted the patient to wear a prothesis. (Illustrations.)
Jerome B. Thomas.

Måhlèn, Sven. **A case of unilateral exophthalmos caused by a meningioma arising from the lesser wing of the sphenoid.** Det oft. Selskab i Köbenhavn's Forhandlinger, 1934-1935, pp. 3-4. In Hospitalstidende, 1935, Dec. 17.

A man of fifty years appeared in January, 1934. complaining of protrusion of the right eye with some reduction of vision, slight dizziness at times, a feeling of pressure on top of the head, and weakness of the legs. Examination showed a right-sided exophthalmos of 7 mm., and limitation of movements of

the eyeball in all directions except nasally. The right pupil was slightly larger than the left, and the right disc showed beginning papillitis. Roentgen films revealed a hyperostosis involving a part of the right orbit and the right lesser wing of the sphenoid. At operation a meningioma with involvement of the bony parts described was found and removed. The patient made an uneventful recovery. At the end of four months he had remained well and had regained normal vision, but the exophthalmos was unchanged. D. L. Tilderquist.

Michaïl, D. **Hematic cyst of the orbit.** Arch. d'Opht., 1935, v. 52, Dec., p. 851.

Hematic cyst of the orbit is a very rare affliction and its pathogenesis has not yet been elucidated definitely. A girl sixteen years old had had her right eye enucleated at the age of 5 years. For the past year and a half the right upper lid had shown a progressive painless swelling, "as large as a peach," associated with regional cutaneous pigmentation and luxation of the tarsus and the upper conjunctival cul-de-sac. Puncture and later extirpation of the new growth showed that it was formed by a membranous pocket with hematic contents which occupied the largest part of the orbital cavity. Histologic examination revealed that the cystic sheath was formed by two layers, the peripheral one fibrous, the internal one granuloidal in character. In the latter was seen a rich network of capillaries, many of which were obliterated and thrombosed, and there were numerous giant cells surrounding a tuft of absorbent cotton. The granulative tissue was in direct contact with the blood contents. After analyzing the literature the author concludes that the cotton left behind at enucleation was an exciting agent. (Illustrations, bibliography.)

Derrick Vail.

14. EYELIDS AND LACRIMAL APPARATUS

Cattaneo, Donato. **Research on the musculature of the lacrimal passages.** Ann. di Ottal., 1935, v. 63, Nov., p. 801.

By means of serial microscopic sections carried through three directions, frontal, sagittal and horizontal, the author determined the disposition and the relationships of the muscle bundles deriving from the muscle of Duverney-Horner in regard to the lacrimal canal. The horizontal portion is provided with fibers horizontal to the longitudinal plane, parallel and oblique in respect to the axis of the canal. The vertical portion is surrounded by facets chiefly situated in the axial plane. As to the connection between the muscle fibers and the walls of the canal, a histologic process was employed that showed a nice differentiation between muscle, elastic, and colloidogenic fibers. Throughout the length of the canaliculi elastic-tissue plexuses are thrown off from the tunica propria and insinuate themselves between the muscle bundles so as to form a close connection between the walls of the canal and the muscle fibers. The facts established lay the basis for further studies as to the part played by the canal in diffusion of the tears. (4 plates, bibliography.)

Park Lewis.

Dodge, W. M., Jr. **An improved lid crutch.** Arch. of Ophth., 1935, v. 14, Dec., pp. 989-990.

Pad-bridge spectacles are fitted with a pair of box studs around which is looped a piece of piano wire curved to fit into the fold of the upper lid and covered by xylonite tubing.

J. Hewitt Judd.

Kiewe, P. **Chalazion-like recurring neoplasm of the lids.** Acta Ophth., 1935 v. 13, pt. 1-2, p. 139.

A recurrent pseudotumor of the upper lid presented an unusual histologic structure. The stroma consisted of thick connective-tissue bundles containing blood vessels. Between these extended a fine fibrous tissue network containing masses of cubic or polygonal cells. The protoplasm of these cells was light and granular, and the vesicular nuclei held an abundance of chromatin granules, but only rarely a nucleolus. Careful histologic study with various stains led to final diagnosis of a pseudotumor of inflammatory origin. Ray K. Daily.

Theobald, G. D. **Pathogenesis and pathologic anatomy of chalazion.** Arch. of Ophth., 1935, v. 14, Nov., pp. 817-824.

After reviewing and summarizing the literature, the author concludes that there is still indecision as to the exact nature of this granuloma.

J. Hewitt Judd.

Van Lint. **Alternate winking.** Bull Soc. Belge d'Opht., 1935, no. 70, p. 29.

A boy of nine years, of neuropathic tendency, developed the habit of alternate winking a few weeks after conjunctival irritation due to an exanthem.

Jerome B. Thomas.

15. TUMORS

Ask, Olaf. **Metastatic uveal carcinoma.** Acta Ophth., 1934, v. 12, pt. 4, p. 308.

To tabulated study of 210 cases r ported in the literature is added a complete history and post-mortem report of the author's case of bronchial carcinoma with two metastatic nodules in the choroid of the right eye. Cancers of the breast, lung, and prostate form metastases in the uvea more frequently than cancers of the stomach, uterus or ovary. The author attributes this to the accessibility of the uvea to tumors of the breast and lung through the pulmonary circulation. He does not accept Ginsberg's assumption of special predisposition of the choroid to metastasis from the breast. (Illustrations.)

Ray K. Daily.

Byers, W. G. M., and MacMillan, J. A. **Treatment of sarcoma of the uveal tract.** Arch. of Ophth., 1935, v. 14, Dec., pp. 967-974.

This study is based on 341 cases found in the literature and 51 personal cases. Only 28.83 percent showed extraocular extension. Since in the prevention of general metastasis there is no choice between primary enucleation and exenteration of the orbit, enucleation with excision of the longest possible piece of the nerve, and leaving the tissues covering the posterior pole of the eyeball intact, may be done first. The necessity of exenteration depends on whether or not extraocular extension is found by routine examination of the eyeball and optic nerve. For this electrocoagulation is recommended.

J. Hewitt Judd.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
640 S. Kingshighway, St. Louis

News items should reach the Editor by the twelfth of the month.

Deaths

Dr. William H. Wilmer of Washington, D.C., died unexpectedly March 12, 1936, aged 72 years. An obituary will be published in an early issue.

Dr. David Aloysius Prendergast, Cleveland, died December 2, 1935, aged 54 years, of bronchopneumonia.

Dr. John Joseph Thomson, Mt. Vernon, New York, died November 13, 1935, aged 56 years, of myocarditis.

Dr. Edwin S. Steese, New York, died February 7, 1936.

Miscellaneous

The Summer Postgraduate Course in Ophthalmology and Otolaryngology at Denver, Colorado, will be held from July 20 to August 1, 1936. The first week's study will be devoted to the eye, and the second week to the ear, nose, and throat. The guest speakers will be Dr. Oscar V. Batson of Philadelphia, Dr. William L. Benedict of Rochester, Minnesota, Dr. Will Otto Bell of Seattle, and Dr. Lawrence T. Post of St. Louis. Inquiries regarding the course may be sent to Dr. H. L. Whitaker, 1234 Republic Building, Denver, Colorado.

The National Society for Prevention of Blindness has announced the appointment of Mrs. Francia Baird Crocker, R.N., as Associate for Nursing Activities, succeeding Miss Mary Emma Smith, R.N., who resigned to accept the position of Director of Public Health Nursing in the New Mexico Bureau of Public Health.

Mrs. Crocker was formerly Director of the Prevention of Blindness Department in the Missouri Commission for the Blind. She received her nursing training at St. Luke's Hospital in Cleveland, obtained a B.S. degree in Business and Public Administration at the University of Missouri, and took the course for medical social eye workers at Washington University, St. Louis.

A steady reduction in the amount of blindness from ophthalmia neonatorum has

resulted from the numerous state laws now in existence which make it compulsory for the doctor, nurse, or midwife to use a prophylactic solution in the eyes of babies at birth; the Society continues to urge this law in those states which have not yet passed it. The establishment of "sight-saving classes" for the education of children with seriously defective vision is stimulated by the Society in communities throughout the country; and, in coöperation with various universities, it sponsors courses for the training of teachers and supervisors of these special classes. The Society works toward the reduction of the eye hazards of industry, demonstrates a technique for testing the eyes of preschool-age children, and strives for conservation of vision in other ways.

Societies

The General Assembly of the International Association for Prevention of Blindness and the International Organization of the Campaign against Trachoma will be held at 3 p.m. on Monday, May 11, 1936 in the Grand Amphitheatre of the Centre Marcelin Berthelot, 28 bis, rue St-Dominique, Paris. The agenda follows: 1. Report by the Chairman, Professor de Lapersonne, on the activities of the International Association for Prevention of Blindness during the past year. 2. Communication by Dr. Park Lewis, Vice-President, on general measures to be taken in order that the Association may extend its scope. 3. Presentation and discussion of the reports on the question chosen at the meeting in London: "Infectious conjunctivitis among children under 10 years of age," namely, A. Report by Professor F. Terrien on the classification of conjunctivitis; B. Report by Mr. Rowland P. Wilson, of the Giza Memorial Ophthalmic Laboratory, on the various forms of conjunctivitis in Egypt and the Near East; C. Communication by Dr. MacCallan, President of the International Organization of the Campaign against Trachoma, on the relationship between conjunctivitis and trachoma; D. Report by Mr. Bishop Harman, Honorary Member of the International Association for Prevention of Blindness, on the prevention of conjunctivitis in children and the social and administrative measures to be recommended.

Those who wish to take part in the discussions of the subjects mentioned should send name and address to the Secretariate of the International Association for Prevention of Blindness, 66 Boulevard Saint Michel, Paris, not later than April 1, 1936, together with title and brief summary of their communication.

The twenty-fourth annual meeting of the Pacific Coast Oto-Ophthalmological Society will be held at Del Monte, California, April 12 to 16, at the Del Monte Hotel. The instruction course, which was an innovation last year, has been made a permanent feature of the meeting. Eight separate courses in ophthalmology and eight in otolaryngology will be given this year.

The third Annual Meeting of the Western Ophthalmological Society took place in Pasadena, California on January 25, 1936. The following program was presented: Col. Robert E. Wright, Madras, India, guest speaker, "Keratomalacia"; Dr. Frank Rodin, San Francisco, "Ophthalmologists, optometrists, and opticians; the origin of these words in the English language"; Dr. David O. Harrington, San Francisco, "The optic radiation in the temporal lobe; with case report of perimetric studies in complete removal of the temporal lobe"; Dr. C. Allen Dickey, San Francisco, "Some unusual cases of squint"; Dr. W. S. Franklin, Santa Barbara, "Some unusual intraocular foreign bodies"; Dr. John E. Weeks, Portland, "The amblyopia of arsenical therapy"; Dr. Edwin M. Neher, Salt Lake City, "Origin of the brille in the rattlesnake"; Dr. William Boyce, Los Angeles, "A motion-picture study of the Elschnig technique"; Dr. Harold F. Whalman, Los Angeles (by invitation), "Hodgkin's disease of the eye, with case report."

The next annual meeting of the society will be held in Denver, Colorado, in connection with the summer course conducted by the University of Colorado School of Medicine and the Colorado Congress of Ophthalmology in July, 1937.

The following officers were elected to serve during the ensuing year: president, Dr. Edwin M. Neher, Salt Lake City; vice-president Dr. Frederick C. Cordes, San Francisco; new members of the council, Dr. Will Otto Bell of Seattle, and Dr. William H. Crisp of Denver; secretary-treasurer, Dr. Andrew J. Browning, Portland.

The following program was given at the Scientific Meeting of the Eye Section of the Philadelphia County Medical Society on March 5, 1936: Dr. Alvin W. Howland, "Detachment of retina," presentation of postoperative cases from Wills Hospital; Dr. Andrew Knox, "Concerning glaucoma and report of a juvenile case"; Dr. Edwin B. Miller, "Case of blindness, showing marked choked discs, due to cerebellopontine-angle tumor, operation, recovery, return of vision," presentation of patient.

The Washington, D.C., Ophthalmological Society held a meeting on March 2, 1936, giving the following program: Capt. Ross T. McIntire, U.S.N., "A case report"; Major Raymond O. Dart, "A case of retinoblastoma"; Dr. Robert H. Courtney, "Uveitis with secondary glaucoma accompanying spontaneous absorption of the crystalline lens"; Dr. Louis S. Greene, "Retinitis pigmentosa."

The International Assembly of the Interstate Postgraduate Medical Association of North America will hold its 1936 meeting in St. Paul, Minn., October 12th to 16th.

The European Assemblies of the Interstate Postgraduate Medical Association of North America will take place from May 16th to July 9th. For information write to Dr. W. B. Peck of Freeport, Illinois.